ENGINEERING NEWS-RECORD

APRIL 14, 1960

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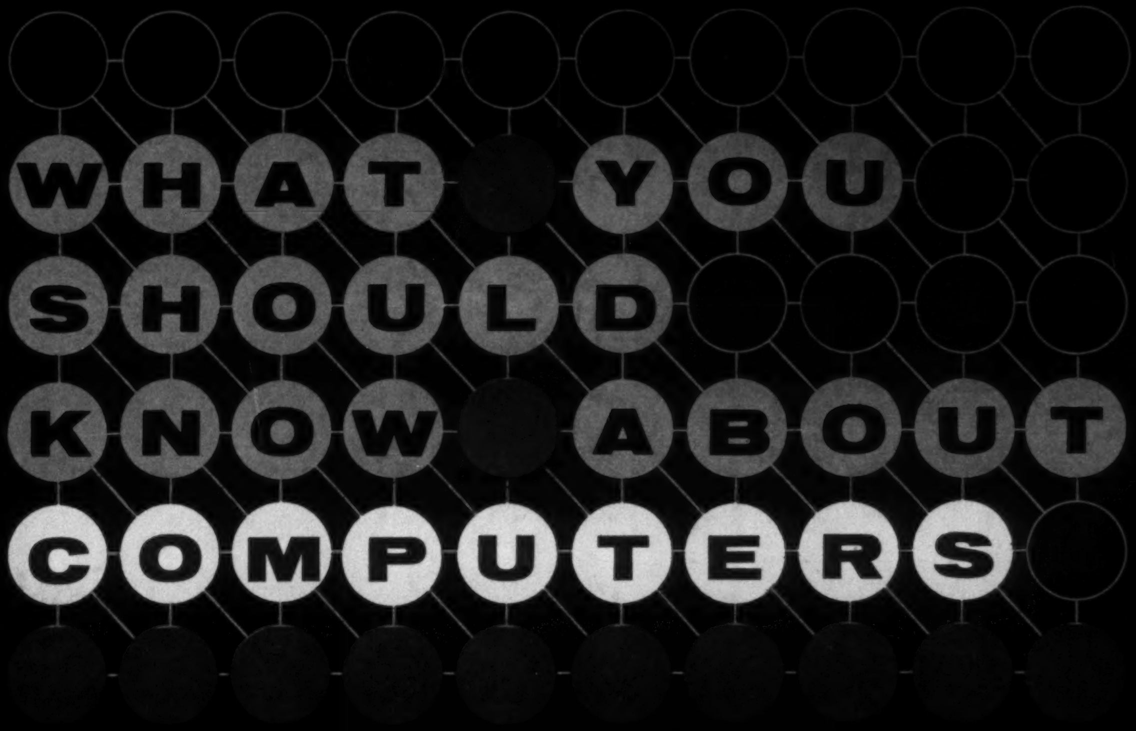

WHAT YOU SHOULD KNOW ABOUT COMPUTERS

Special Report p. 39

A McGRAW-HILL PUBLICATION

GS STEVENS RICE
UNIV MICROFILMS INC EDI
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ANN ARBOR MICH

HORTONSPHERE
helps advance
missile technology

The flight of a ballistic missile entering the earth's atmosphere is simulated in an Atmosphere Entry Simulator built by the National Aeronautics and Space Administration at Ames Research Center, Moffett Field, California.

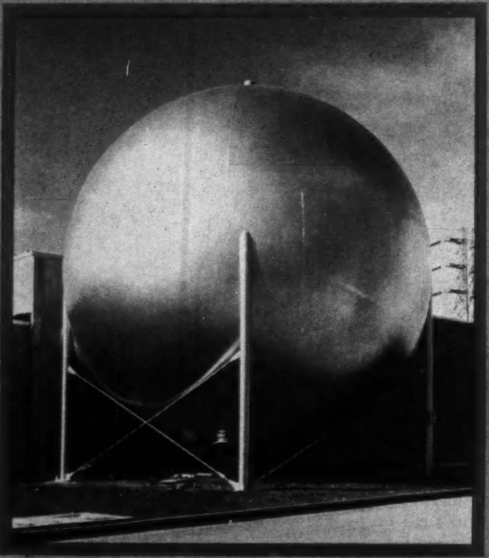
Employing the Ames Simulator, space scientists quickly and economically determine in the laboratory whether a specific design can survive re-entry.

CB&I fabricated and erected several vital components for this important research facility. Included are a 30½ ft. diameter steel vacuum sphere and a 10 ft. diameter duct and elbow.

Craftsmanship in Steel—skillfully developed by CB&I over more than seven decades—builds quality into plate structures for any kind of service. You will profit by contacting our nearest office for full details.

CB&I fabricated and erected steel vacuum sphere (left) and 10 ft. diameter duct and elbow (below, far right) for the Ames Atmosphere Entry Simulator.

E66CB



CHICAGO BRIDGE & IRON COMPANY
332 SOUTH MICHIGAN AVENUE
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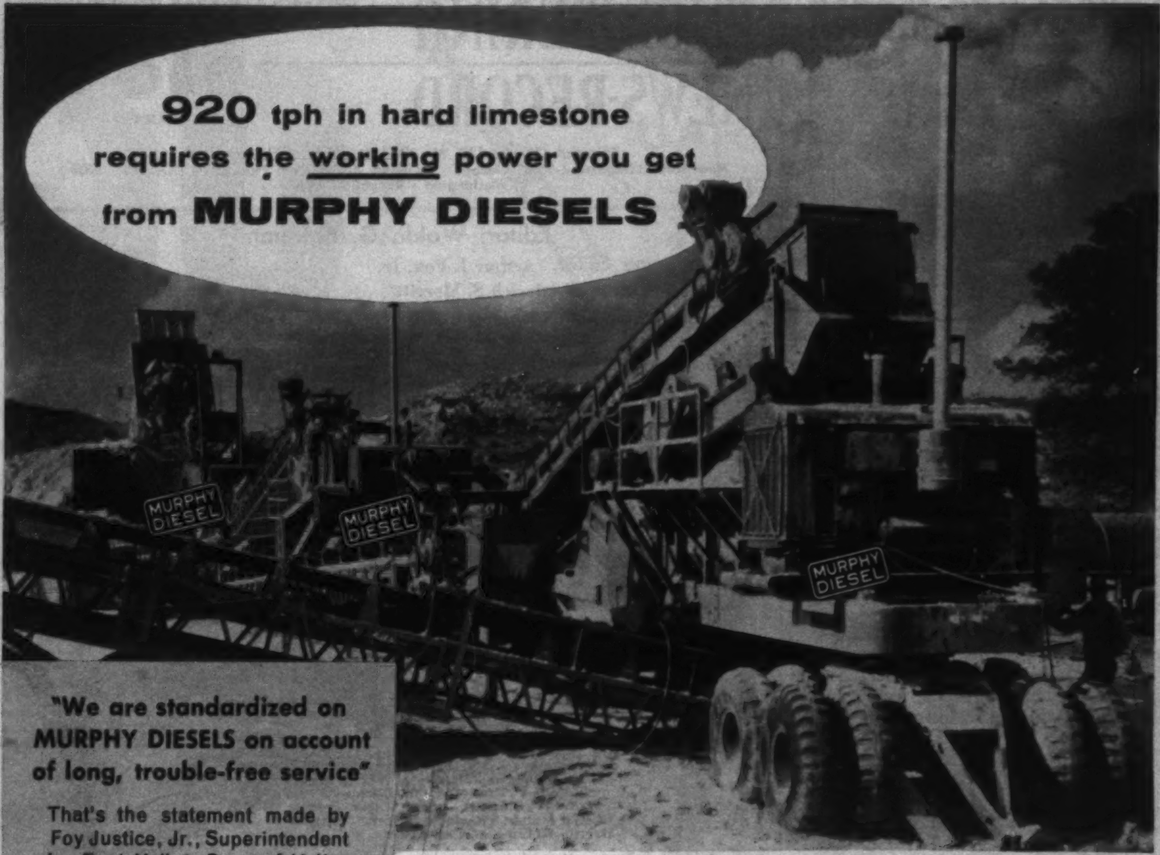
OFFICES AND SUBSIDIARIES IN PRINCIPAL CITIES THROUGHOUT THE WORLD


920 tph in hard limestone requires the working power you get from MURPHY DIESELS
MURPHY DIESEL
MURPHY DIESEL
MURPHY DIESEL

"We are standardized on MURPHY DIESELS on account of long, trouble-free service"

That's the statement made by Foy Justice, Jr., Superintendent for Fred Hall & Sons of Valley Mills, Texas. And Mr. Justice has had plenty of experience with the performance of Murphy Diesels . . . they have 13 Murphys powering their Pioneer crushing plants and Northwest shovels to put more power into the job. On the job shown above, power for the crushing units is furnished by two 225 HP (continuous) Murphys, a 177 HP (continuous) Murphy, and a 150 KW Murphy Diesel Generator Set. They are producing crushed limestone for rebuilding U. S. 190 between Belton and Kileen, Texas.

Production of 800 to over 900 tons of hard Edwards limestone per hour is no accident! It is good management on the part of Texas contractor Fred Hall & Sons in selecting the right crushing plants *and putting Murphy Diesel Power into the job.* These are the engines that give you the kind of usable, hard-working power needed for crushing.

Murphy Diesels provide good lugging power because of high rising torque to help keep your equipment running at the right operating speed for efficient production and more profit. They give you steady production shift after shift with lowest engine maintenance costs, plus the economy and dependability of "true diesel" operation. Your Murphy Diesel Dealer has the facts. See him today.

MURPHY DIESEL

428-N

PUTS MORE POWER INTO THE JOB

MP Series Murphy Diesel engines and power units are available in sizes from 105 to 320 HP with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 60 to 188 KW.

MURPHY DIESEL COMPANY

5321 W. Burnham St., Milwaukee, Wisconsin

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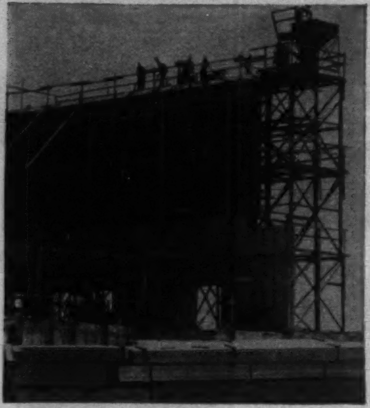
Throughout the Nation

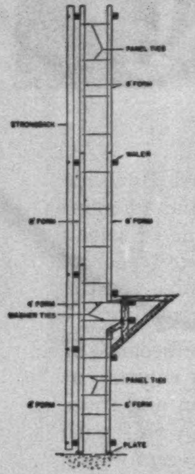
Saved! One Month



Extensive Use of Symons Steel-Ply

...Speeds Work on "Rush" Job

New, non-military, air route traffic control center building near Fremont, California will help control and direct aircraft, prevent collisions, and guide "lost" planes over a wide western area.



J. H. Pomeroy & Co., Inc. San Francisco was the contractor.

The project was unusual because of the speed with which it had to be erected. The building is perhaps the first non-military structure in the west that has been designed to withstand atomic "fallout." The contractor gave careful study to the most time-saving methods. Symons Steel-Plys proved to be one of the principal time-savers. They were used on all major construction and were also adapted for pouring of large, reinforced concrete beams that were set between steel columns for blast protection.

Complete "Air Route Traffic Control Center" story sent *free* upon request. Symons Steel-Plys can be rented with purchase option.

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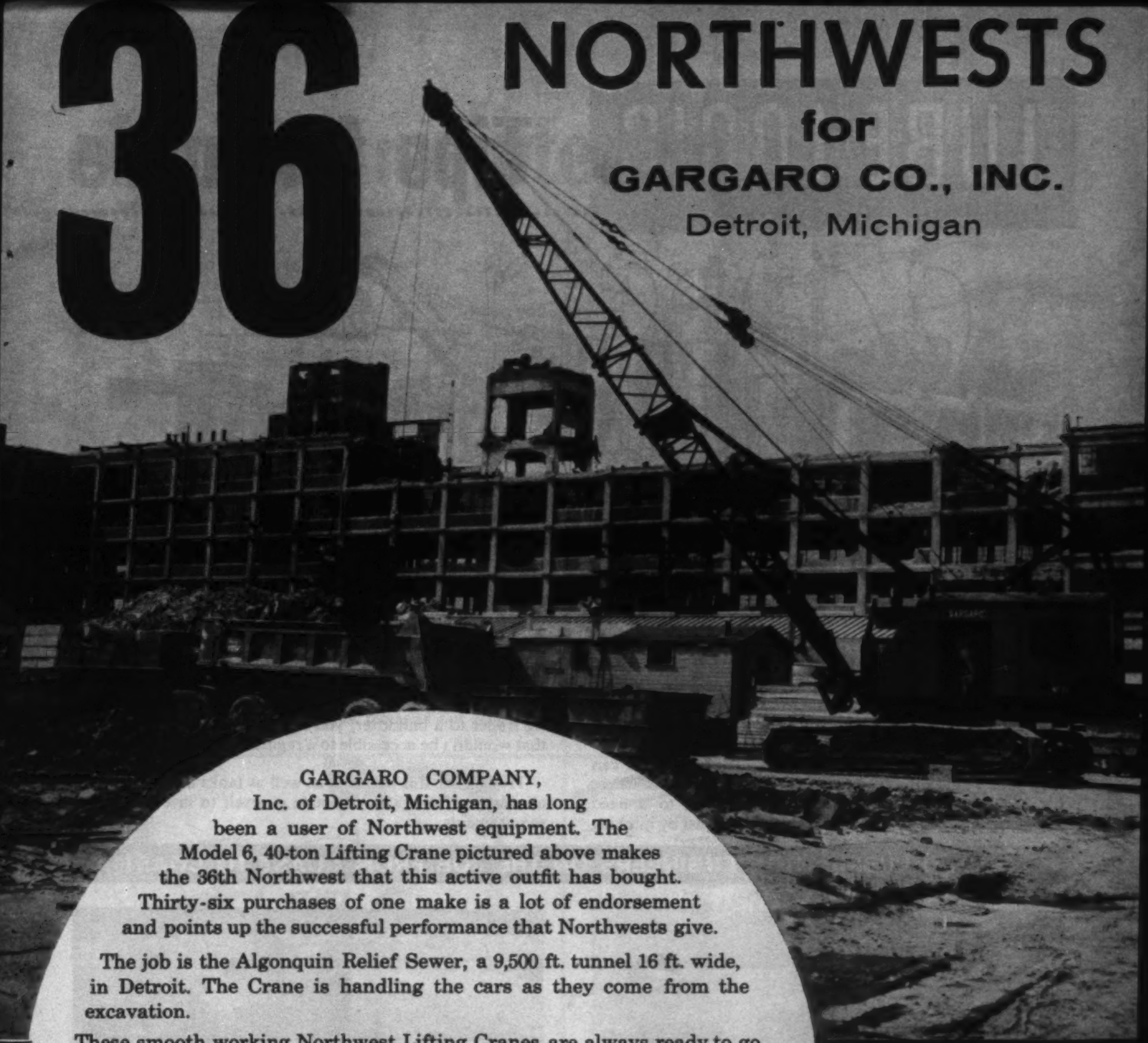
36 NORTHWESTS for GARGARO CO., INC.

Detroit, Michigan



GARGARO COMPANY, Inc. of Detroit, Michigan, has long been a user of Northwest equipment. The Model 6, 40-ton Lifting Crane pictured above makes the 36th Northwest that this active outfit has bought. Thirty-six purchases of one make is a lot of endorsement and points up the successful performance that Northwests give.

The job is the Algonquin Relief Sewer, a 9,500 ft. tunnel 16 ft. wide, in Detroit. The Crane is handling the cars as they come from the excavation.

These smooth working Northwest Lifting Cranes are always ready to go. Heavy-duty Independent High Speed Boom Hoists stand hour after hour booming. There is plenty of cable capacity and a 3d drum gives you three load lines. Smooth swing and the *true* feel of the load which comes with the Feather-Touch Clutch Control assures greater accuracy in spotting loads. Sectional Boom Hoist Rigging, Pendent Lines and Boom Struts, Flange connected Booms with either open or closed throats — everything you require for any crane operation is available.

If you are considering new Crane, Shovel, Dragline, Pullshovel or Truck Crane equipment, give some thought to why so many Northwests are repeat orders. Let a Northwest man bring you up-to-date on the latest Northwest advantages.

NORTHWEST ENGINEERING COMPANY
1502 Field Building, 135 South LaSalle Street
Chicago 3, Illinois

You can say... "THEY'RE ALWAYS READY TO GO!"

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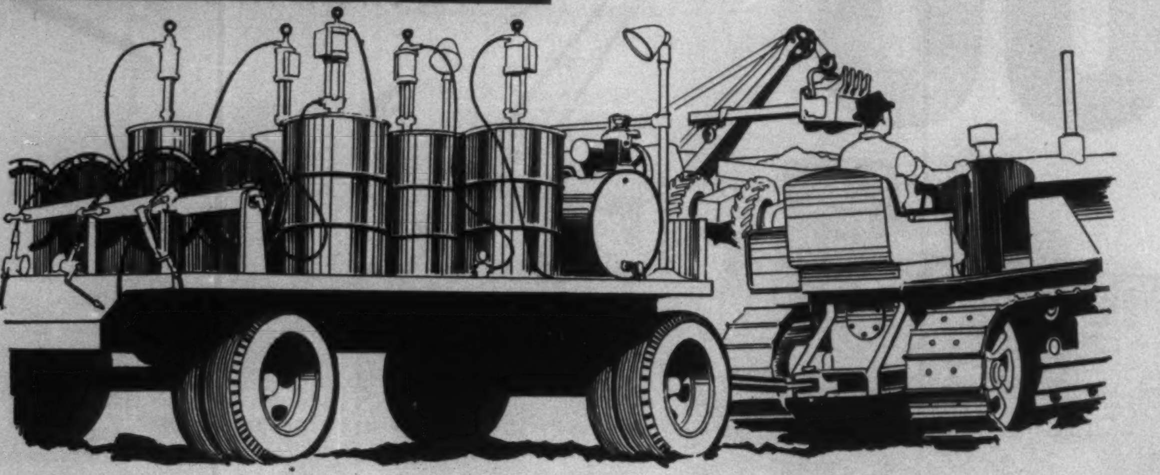
TRUCK CRANES

NORTHWEST

LUBE LOGIC Tips for more



Do-it-yourself lube rig trailer

Maybe you're aware of all the advantages of a mobile lube rig, but just don't want to tie up a truck for this purpose. Or, perhaps you'd like a supplementary rig. You can solve either problem neatly by mounting your field lubricating equipment on a standard 5-ton farm trailer. That way, you can take your whole simplified lube plan out into the field where it's needed, without costly deadheading back to a fixed service point—and you can move the lube rig just by hitching it to any truck, so it's just as mobile as a truck mounted rig at much less cost. And here's a bonus: by hitching your lube rig trailer to a bulldozer, you can take field service to spots that wouldn't be accessible to a regular truck.

Trailers for this purpose, as well as tanks and pumps, are all standard items you assemble yourself to meet your own requirements.

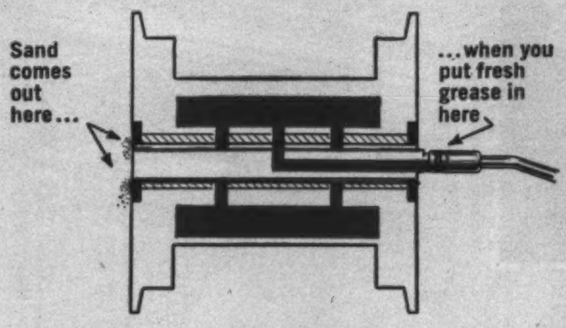
TEXACO LUBRICATION ENGINEERS ON THE JOB FROM COAST TO COAST

ROCKY REACH DAM AND POWERHOUSE on the Columbia River, Washington (above). W. N. Evans (left), Manager for Rocky Reach Contractors, discusses Simplified Lubrication Plan with E. S. Saunders, Texaco Contractor Sales Representative.

HOGBACK DAM, Riverton, Conn., (upper right) is part of the greater Hartford water supply system. Texaco man-on-the-job is H. F. Porter (left) shown with John Toffolon, Vice President, White Oak Contractors, Inc., General Contractors.

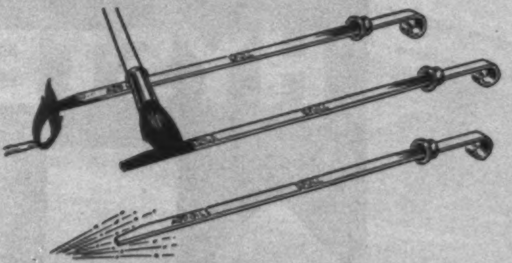
INTERSTATE HIGHWAY 80 PROJECT at Colfax, Iowa (right). Texaco Engineer E. A. Howles (right) works closely with Mott Construction Company on the important assignment of keeping equipment on the job and maintenance costs low.

efficient maintenance



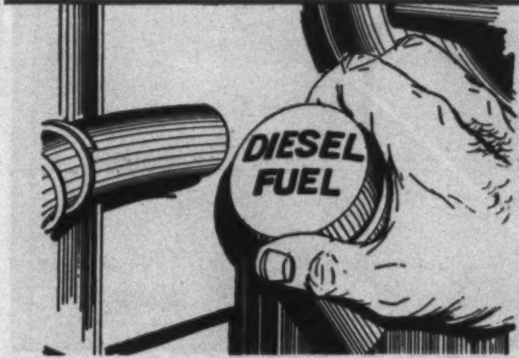
Track-roll enemy No. 1: sand

If you're operating a crawler-tractor in sandy soil, the best way to keep sand from getting into the track-roll bearings is to keep purging the bearings with fresh grease. Track-roll bearing seals are especially designed for this type of purge-lubrication, and the grease that comes out around the edges of the seal during lubrication carries the sand out with it.



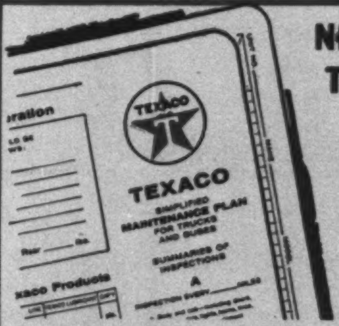
How to read dipsticks without squinting

The modern inhibited motor oil that keeps the inside of your engine clean also keeps the oil dipstick clean—and often too shiny to read. Here are three solutions for this problem—take your choice. 1. Heat the end of the dipstick so the metal darkens slightly. 2. Paint the end of the stick with a dull-finish cellulose lacquer. 3. Run the stick across the spark-plug cleaner to take off some of the shine. (If you use the spark plug cleaner, use the smallest rubber plug bushing and hold the dipstick over the hole with a wad of cloth to keep sand from scattering around the lube bay.)



Identify the fuel you want

Let one absent-minded maintenance man put gasoline in your diesel tank and as the fliers say "you'll be bailing out over Denver." It's happened. Best way to avoid its happening to *you* is to mark your fill cap "Diesel Fuel" or "Gasoline". Then nobody should make any mistakes.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TEXACO
SIMPLIFIED MAINTENANCE PLAN FOR TRUCKS AND BUSES
SUMMARIES OF INSPECTIONS

NEW TRUCK RECORD FOLDER fits itself into your schedule

Texaco's flexible new truck record folder lets you stick to the lube schedule that works best for you without running into bookkeeping problems. Lubrication and oil schedules are completely separate from mechanical maintenance and replacement parts schedule—you don't have to follow any pre-established routine to use the folder profitably. And this new folder accounts for every single dollar you spend on truck maintenance for a whole year. Write for your folders today.

TEXACO LUBRICATION ENGINEERS

Every month we'll bring you a batch of "sleepers", little angles, so easy to overlook, where big savings in money and time can be made. But month in, month out, your local Texaco Lubrication Engineer is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control."

Texaco Inc., 135 East 42nd Street, New York 17, N.Y.

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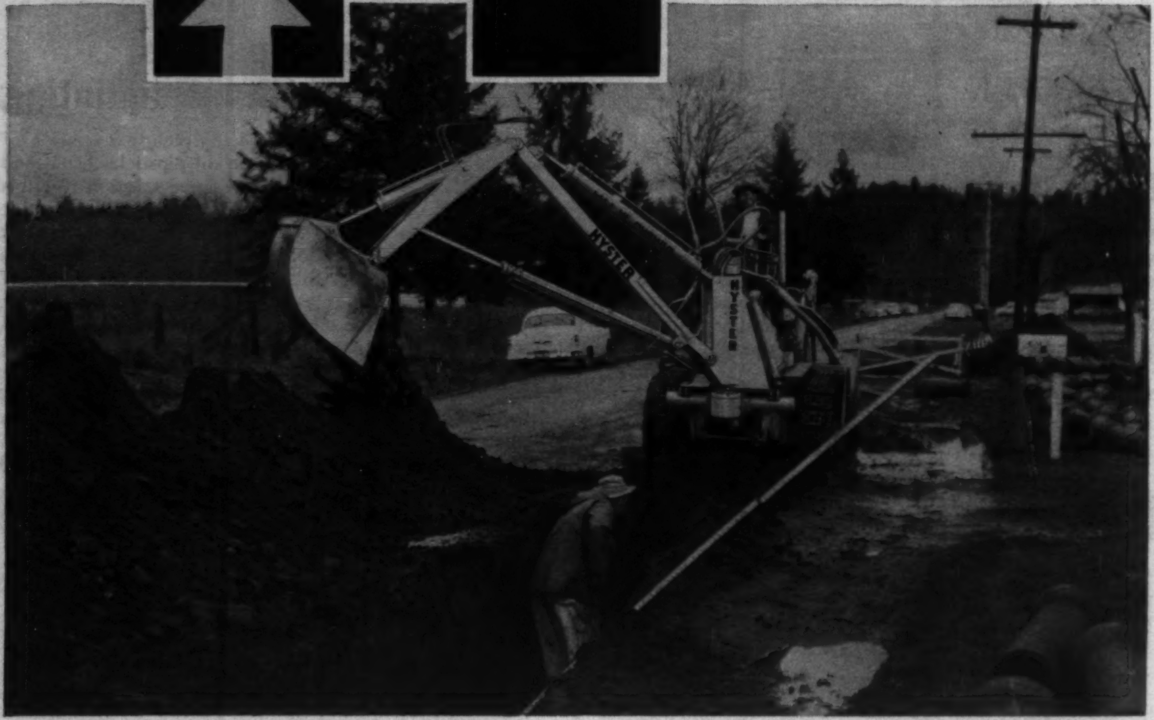

Dig and backfill

with one machine —

HYSTER® has it!

The Hyster Backhoe on a CAT-Built Traxcavator does double duty — digs and backfills — with one operator.

Gives highest production of any tractor-mounted hydraulic hoe.

Ideal for municipal development work.

An economical utility tool for water, gas and sewer trenching.

See your Caterpillar-Hyster dealer for full information.

Caterpillar, Cat and Traxcavator are trademarks of Caterpillar Tractor Co.

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INDUSTRIAL TRUCK DIVISION — Lift trucks, mobile cranes, straddle carriers
MARTIN TRAILER DIVISION — Heavy machinery hauling trailers
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HYSTER COMPANY
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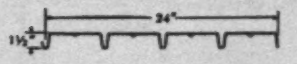
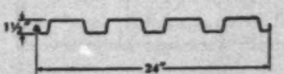
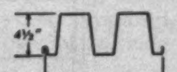
When it comes to roof systems, INLAND covers everything!



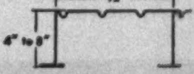
A-DECK — For purlin spacings not exceeding 8'4". Narrow ribs provide deck surface that supports the thinnest or softest type of insulation.



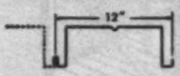
B-DECK — For spans to 10'0". Wide rib distributes metal for greater structural efficiency — gives higher section properties per pound of steel — well suited for use as side wall panels.



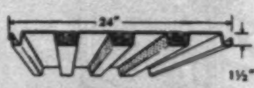
C-DECK—Carries normal roof loads over spans up to 24'0". Used extensively in canopies.



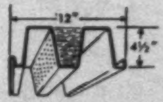
T-STEEL — New! Galvanized only — for clear spans to 32'0". Adaptable to acoustical and flush, luminous ceiling treatments. Provides superior diaphragm to transmit seismic and wind loads.



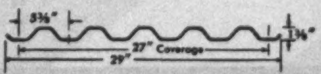
H-DECK — New! For simple spans from 10'0" to 20'0" — 3 and 4½" depths. Especially practical to cover walkways in shopping centers, schools, other installations.



B-ACOUSTIDECK — Two-in-one panel combines steel roof deck with acoustical ceiling having Noise-Reduction Coefficient of .70 — used for spans to 10'0".



C-ACOUSTIDECK — Offers same Noise-Reduction Coefficient as B-Acoustideck. Can be used for spans to 24'0".



RIBFORM — High tensile galvanized steel form for concrete slabs over spans up to 8'0". Three types: Standard, Heavy-Duty, Super-Duty.

◆ Whether your design calls for a dry insulation board roof or for wet-fill, there's an Inland roof system for the job — by the makers of famous Milcor steel building products.

Inland steel deck weighs less than half as much as poured-in-place or pre-cast construction. You can space joists wider and use lighter framework, to save both time and money. Panels are easy to handle and weld in place — in any weather that a man can work.

Types A, B, C, and H decks have the additional advantage of a Bonderized, baked-enamel prime finish that resists on-the-job damage. One field coat of paint on these Inland decks usually covers.

Write for catalogs 240, 241, and 245 — or see Sweet's sections 2c/Inl, 11a/In, and 2a/In.

member of the INLAND steel family

ENGINEERED PRODUCTS DIVISION

INLAND STEEL
PRODUCTS COMPANY

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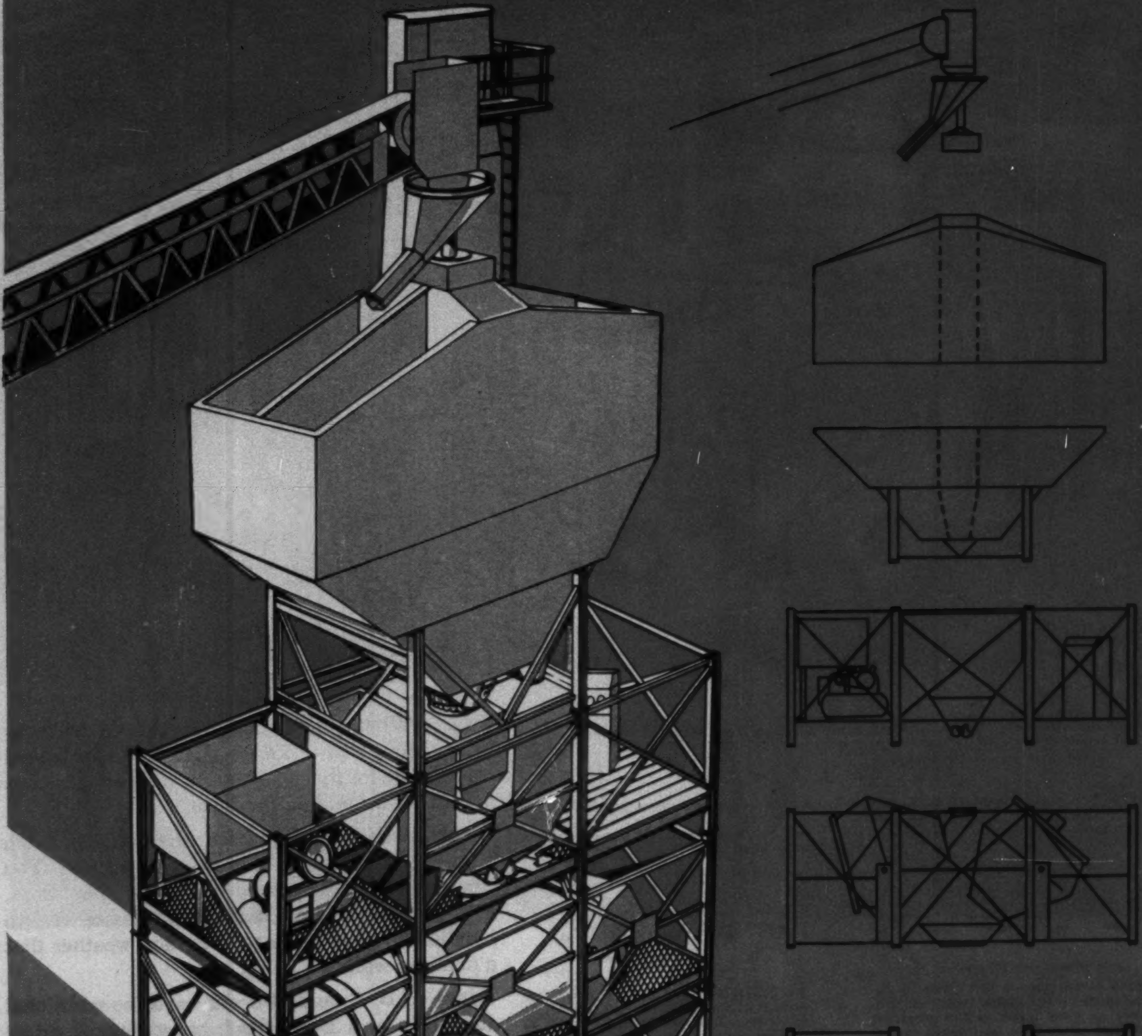
EP-1A

ATLANTA, BALTIMORE, BUFFALO, CHICAGO, CINCINNATI, CLEVELAND, DALLAS, DENVER, DETROIT, KANSAS CITY, LOS ANGELES, MILWAUKEE, MINNEAPOLIS, NEW ORLEANS, NEW YORK, ST. LOUIS

You'll get OVER 200 CU. YDS. AN HOUR . . .

with this Johnson twin-mix paving plant



Just a minimum of pre-assembled units to handle (top to bottom): pivoted distributor and base; upper bin section quickly bolts to lower bin cradle; packaged batcher unit complete with scales, controller; mixers permanently mounted in self-contained mixer section; support panels with built-in steel access ladders.

JOHNSON

KOEHRING PRODUCT

C. S. JOHNSON COMPANY . . .

4½ CU. YD. BATCH (10% overload)	2½-MIN. MIX TIME	2-MIN. MIX TIME
Cycle time	90 sec.	75 sec.
No. batches per hour	40	48
Cu. Yds. per hour	180	216

Puts batching, mixing on continuous production-line basis—

Secret of high output in the Johnson TWIN-MIX plant is continuous split-second weighing, batching, mixing. Twin 112-S tilting mixers, air-ram controlled, interlocked, discharge only when pre-set mixing cycle is complete. Truck driver triggers the discharge switch. Fast, efficient on central-mix paving, or any mass-concrete jobs.

Weighs cement separately—meets rigid concrete specs.—

Overhead storage bin is divided into 4 aggregate compartments, each holding 28½ cu. yds. (43 tons @ 3,000 lbs. per cu. yd.). Central cement compartment has 125 to 150-bbl. (600 cu. ft.) capacity. All materials weigh out automatically through Johnson® Concentric batcher with individual scale for separate weighing of cement.

60 pre-set mixes—continuous graphic recording—

At the turn of a dial, operator selects any one of 60 different mixes. All aggregates, cement, water are dial-controlled. Graphic recorder accurately registers weight of each material, with time, date, batch serial number, and mix identity all on same chart!

Portable-section design—easy stack-up assembly—

For all its size, capacity, TWIN-MIX plant comes in easily-shipped units: 2-section bin; pre-assembled mixer section; complete-package batcher section—all with pre-fit couplings, quick plug-in connections. No unit over 11 ft. wide, 12 ft. high.

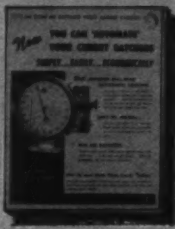
Be ready to bid and take more concrete jobs this year, earn more profit per job — get all the facts on this high-production TWIN-MIX plant without delay. Your Johnson distributor is the man to see. Call him today, or send coupon for facts-by-mail.

• • • CHAMPAIGN, ILL. • STOCKTON, CALIF. *A Division of Koehring Company*

more IDEAS for you:

Electronic Batch Controls

for automatic batching of pre-set mixes are graphically described in new technical 8-page bulletin. Special section devoted to packaged circuits, ad-mix batching, graphic recording.



"Automata" Cement Batchers

New Johnson dial-head control system fits any make of cement batcher, quickly installed in just a few hours time. Read all about it in new illustrated spec. sheet — yours for the asking!

CONCRETE MIXERS

Heavy Construction Mixers

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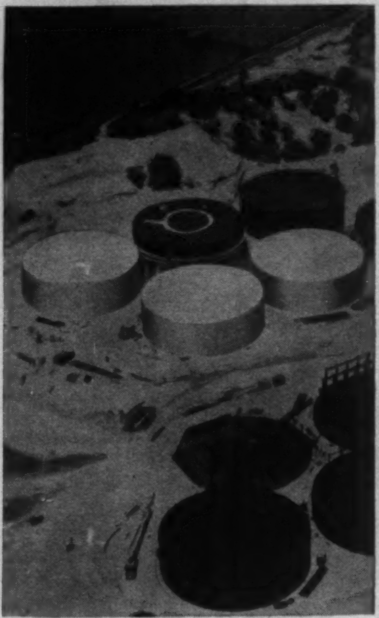

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Reader Comment

Big Future for Cold-Twisted Bars

Sir—Your editorial, "Next: High-Strength Reinforcing" (ENR March 3, p. 92) points the way to a brilliant future in the art of reinforced concrete construction. The higher strengths can make possible application of reinforced concrete to members heretofore not considered practicable, such as slimmer columns and shallower or longer flexural members.

By decreasing material, placing and handling costs, high-strength reinforcing can also reduce the cost of the types of structural members now in use. Continuously reinforced concrete pavement, which employs high-strength reinforcing, already has had a degree of success.

As producers of a high-strength cold-twisted reinforcing bar, trade-marked Webrib, we believe that your statement concerning the reluctance of engineers to use this type of steel in the past needs further amplification.

The inference of the editorial concerning the ultimate tensile strength of cold-worked steel is questionable, since it is a well known fact that the ultimate capacity of a flexural member is dependent on the yield strength of the steel. A check of ASTM A82-34 shows that ultimate strength exceeded the yield strength of most of the cold-worked reinforcing products available in the last 20 years by 15% to 25%.

Cold-worked reinforcing in the form of cold-drawn steel wire has been permitted working stresses of 30,000 psi in the U. S. for a number of years, in accordance with the ACI building code.

European codes have accepted a ratio of ultimate strength to yield strength of 1.14. The reason for such acceptance might be explained best by an advertisement which appeared in ENR Nov. 26, 1959, p. 6 and 7. The manufacturer, U. S. Steel Corp., stated, "Actually, cold-drawn steel wire has no yield point in the conventional sense—no sudden excessive elongation. This means that cold-drawn wire tends to resist stress practically throughout its entire strength range without revealing any sudden elongation such as develops in a typical hot-rolled bar. This physical advantage of cold-drawn wire makes it the ideal concrete reinforcement."

The validity of this advertisement and its application to cold-twisted reinforcing bars has been realized by European engineers and codes for the past 20 years.

American engineers and the construction industry could benefit from this type of superior reinforcing material if the national reinforced-concrete codes would not limit themselves to producer-type specifications that tend to restrain development of improved bars.

The recent improved bar deformations to which ENR refers were developed about 11 years ago and are covered by ASTM Specification A305. This development occurred as a result of standardizing deformations and because of a demand for better bond by engineers in going from 18,000 to 20,000 psi working stress in the bars. Now we are prepared to jump from 20,000 to 30,000 psi and possibly more without improving bond characteristics of bars.

The method, proposed by Prof. Winter and Mr. Hognestad, of using smaller and more bars to secure a high ratio of perimeter to area will, of course, work. However, this procedure will lead to higher placing and material costs, since the smaller bars have larger size extras. In the final analysis, it might produce little, if any, cost savings.

Improved bond characteristics should accompany the increase in working stress if a worthwhile savings is to be produced. This has been taken into consideration in developing a bond characteristic for the Webrib bar that is 50% greater than that of the ASTM A305 deformed bar of equal weight.

Henry V. Kominek
Copperweld Steel Co.
Warren, Ohio

Consulting Engineers

Sir—As public relations chairman for the New York State Association of Consulting Engineers, Inc., I want to congratulate you for your excellent editorial on the achievements of the Consulting Engineers Council (ENR Dec. 10, 1959, p. 92).

It was, indeed, a clear and concise account of the objectives pursued by the Consulting Engineers Council which are, as phrased aptly by your editorial, "wholly consistent with the interests of the public which consulting engineers serve."

Our association is a Member of CEC and is naturally pleased with the progress taken by the national organization. You may be interested to learn that the efforts our association is taking are much similar to those that you attribute to CEC.

Frank E. Kulas, Chairman
Public Relations & Publications Committee, New York State Association of Consulting Engineers, Inc.
Rochester, N. Y.

(*Reader Comment continued p. 14*)

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

MISSISSIPPI—Cook Construction Company of Jackson, Mississippi had their Huber-Warco 5D-190 motor grader leveling fill on a recent levee construction project at Natchez, Mississippi. The grader also maintained haul roads, cut ditches and bank sloped on the project.

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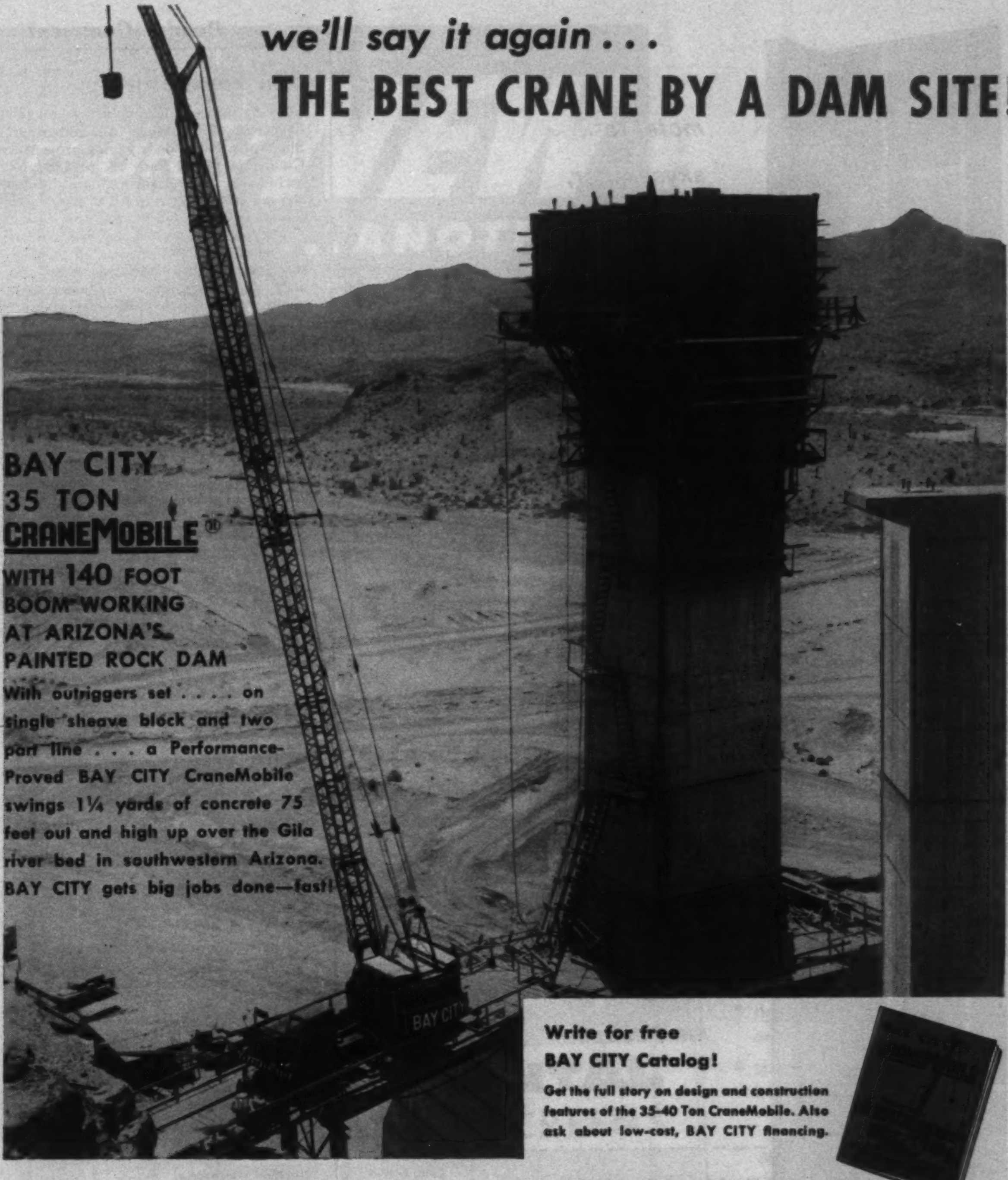

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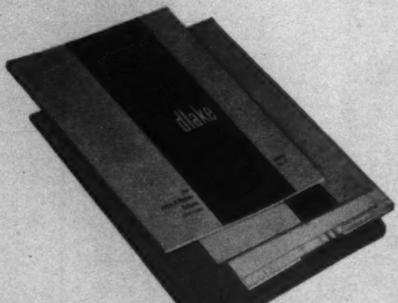

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. . . **Reader Comment**

Slip Form Slip Up

Sir—At the end of your article on the operation of a Guntert & Zimmerman Slip Form Paver on a paving project in California (ENR Jan. 14, p. 38) you included a photograph and story about the use of one of our REX Slip Form Pavers in North Carolina.

The juxtaposition of the two articles has caused some confusion. In the first paragraph of the California story you state that the Guntert & Zimmerman paver "rates up to 4,000 feet a day." The material under the picture of the REX Slip Form states that it "can lay about 2,000 feet . . . per day."

What is not made clear is that the Guntert & Zimmerman paver was operating in the State of California where the 4,000 ft was obtained in 10 hours working with a batch of 1.5 cu yd and a 50-second cycle on the 34ED mixing paver. The State of North Carolina job was on an average of eight hours per working day with a 1.3 cu yd batch and a 60-second cycle on the 34ED mixing paver.

This has given many persons the impression that the REX Slip Form Paver has only half the capacity of the Guntert & Zimmerman machine. This, of course, is not the case. A REX Slip Form Paver is presently operating in California at rates exceeding 425 linear feet per hour. The equipment has a capacity of up to 600 ft per hour.

J. J. Marcello
Chain Belt Co.
Milwaukee, Wis.

For Your Calendar . . .

American Institute of Architects, annual convention, Mark Hopkins Hotel and Masonic Temple, San Francisco, Calif., Apr. 18-22. Write: American Institute of Architects, 1735 New York Ave., N. W., Washington, D. C.

Third Biological Waste Treatment Conference, Manhattan College, New York, N. Y., Apr. 20-22. Write: Civil Engineering Dept., Manhattan College, New York 71, N. Y.

Construction Specifications Institute, annual meeting, Palo Alto, Calif., Apr. 25-27. Write: Construction Specifications Institute, 632 Dupont Circle Building, Washington 6, D. C.

American Welding Society, annual convention and show, Great Western Exhibit Center, Los Angeles, Calif., Apr. 25-29. Write: American Welding Society, 33 West 39th St., New York 18, N. Y.

Purdue Industrial Waste Conference, Purdue University, Lafayette, Ind., May 3-5. Write: Prof. Don E. Bloodgood. Purdue University School of Civil Engineering, Lafayette, Ind.

ASCE Engineering Mechanics Division, structural mechanics conference. School of Civil Engineering, Purdue University, Lafayette, Ind., May 5-6.

American Water Works Association, annual conference, Americana Hotel, Bal Harbour, Fla., May 15-20. Write: American Water Works Association, Inc., 2 Park Ave., New York 16, N. Y.

Air Pollution Control Association, annual meeting, Netherland-Hilton Hotel, Cincinnati, Ohio, May 22-26. Write APCA Annual Meeting, 2400 Beekman St., Cincinnati 14, Ohio.

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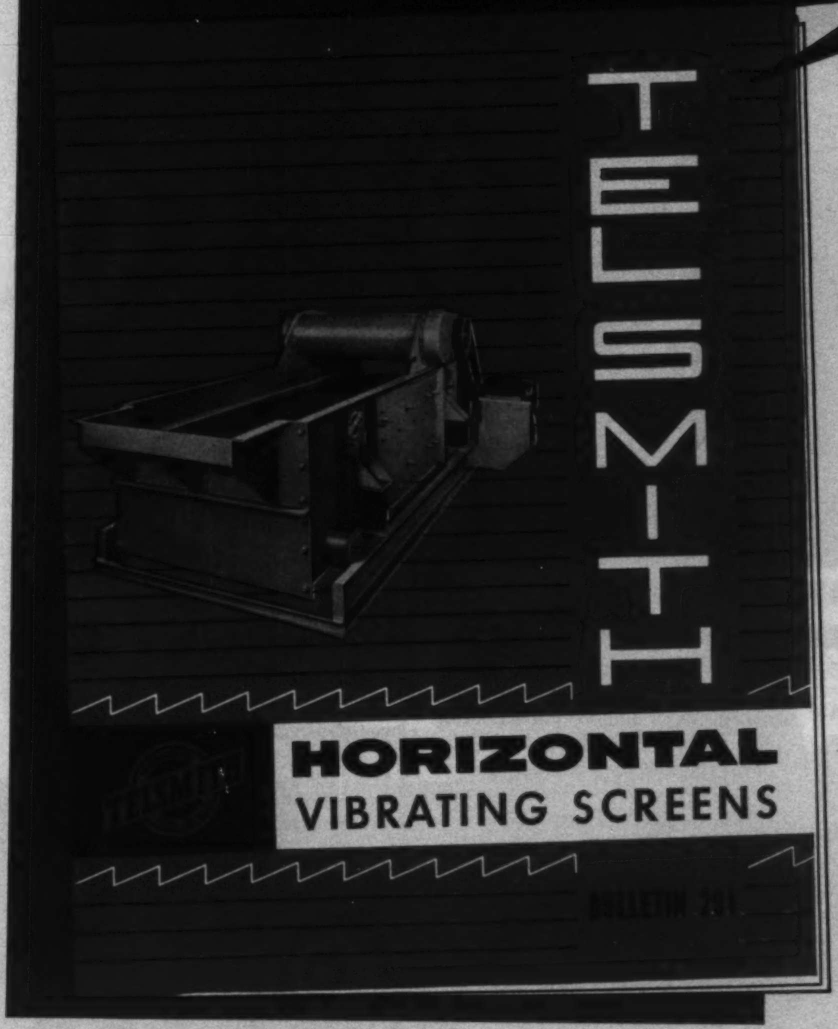

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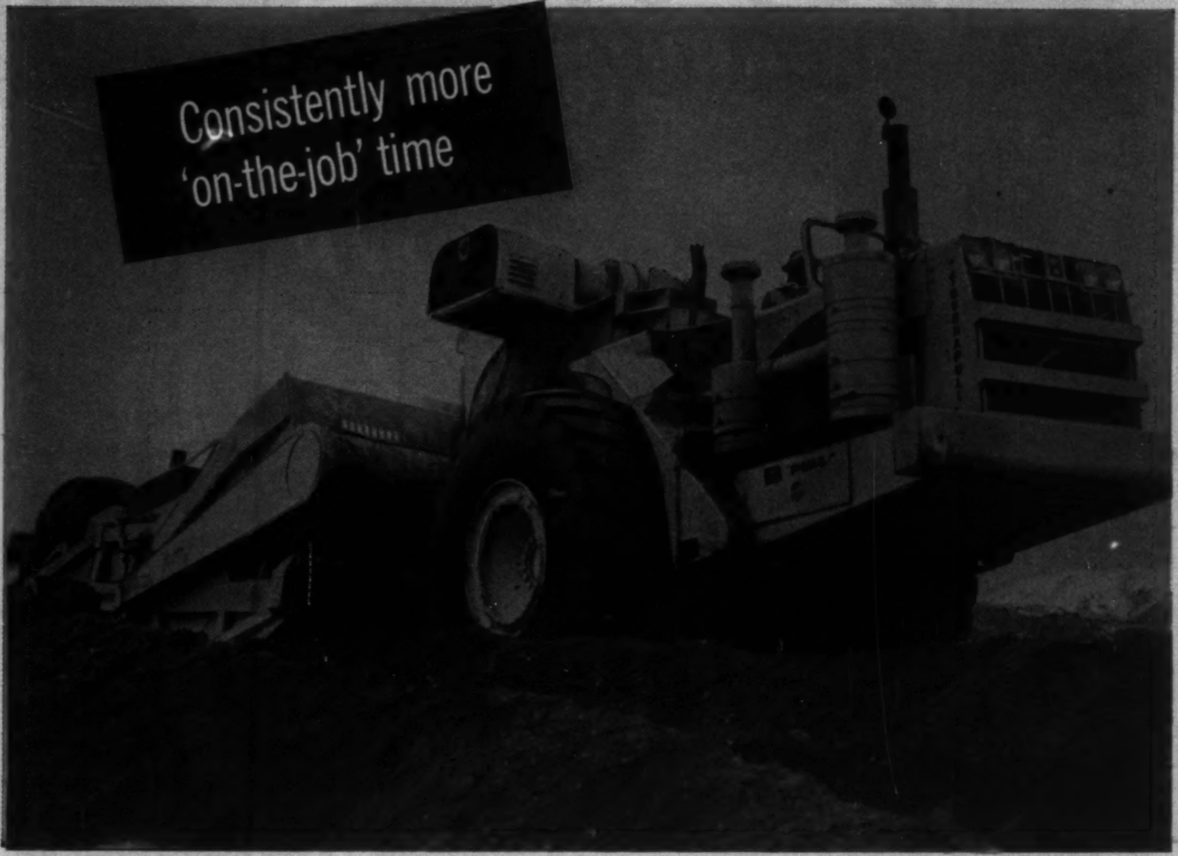

Ask Nick Pinello what he likes about the "Jimmy" Diesels in his earthmovers and he'll tell you "consistently more 'on-the-job' time." And that's just one reason why he picks GM Diesels when he's picking power.

For he'll also tell you his Tournapulls and "Twin C" pusher have racked up as much as 5,500 hours with "scarcely a day in the shop" and no major overhaul. That record is one reason Nick says this about engine parts, "We haven't begun to stock them."

And it's a big reason why Pinello Construction is making such good time on the 1,700,000-yard grading job they're handling outside Colorado Springs. With equipment spending more time on the job—less time in the shop—the dirt's bound to move . . . fast.

This Colorado Springs company currently operates two "B" Tournapulls powered by turbocharged 6-110 "Jimmys," three "C" Tournapulls with "6-71's" and the "Twin C" pusher with two "6-71's." The units have given up to three and a half years' service.

Get GM Diesels in your equipment and you'll have units that spend more time *on* the job—make more money *from* the job. Proof? See your GM Diesel distributor—he's in the Yellow Pages under "Engines, Diesel"—or mail the postcard for full information.

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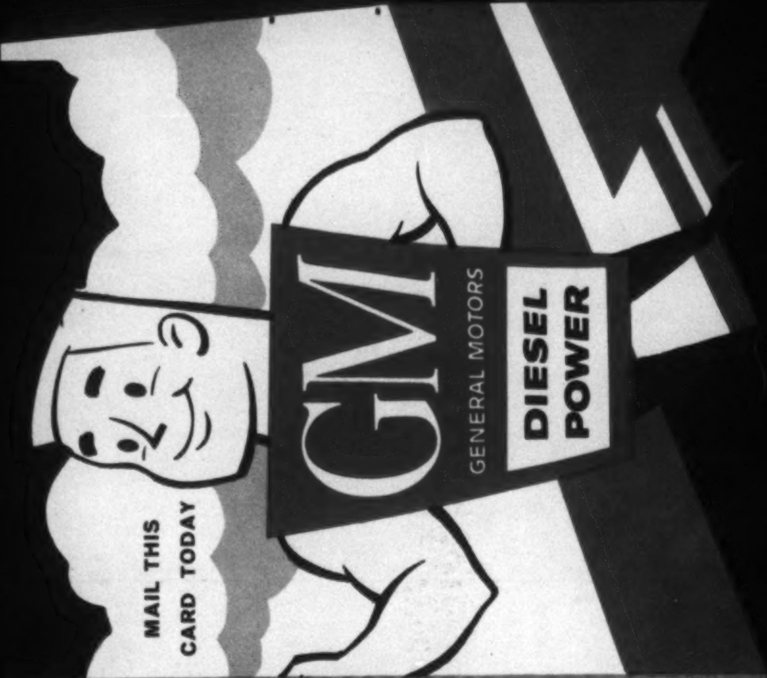
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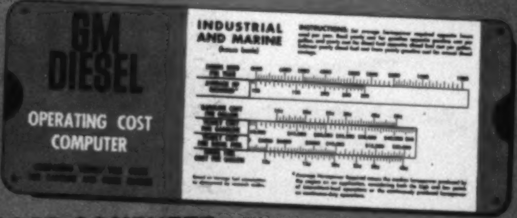
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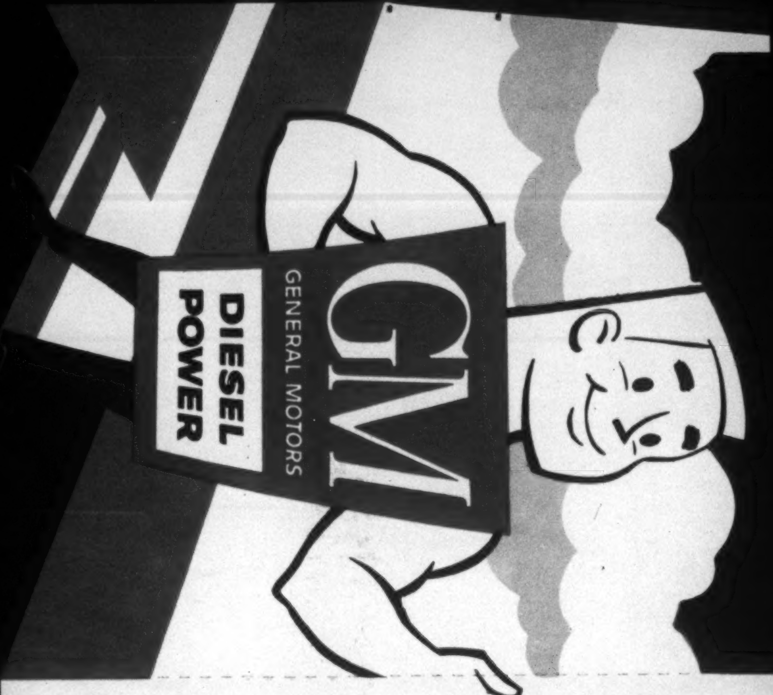
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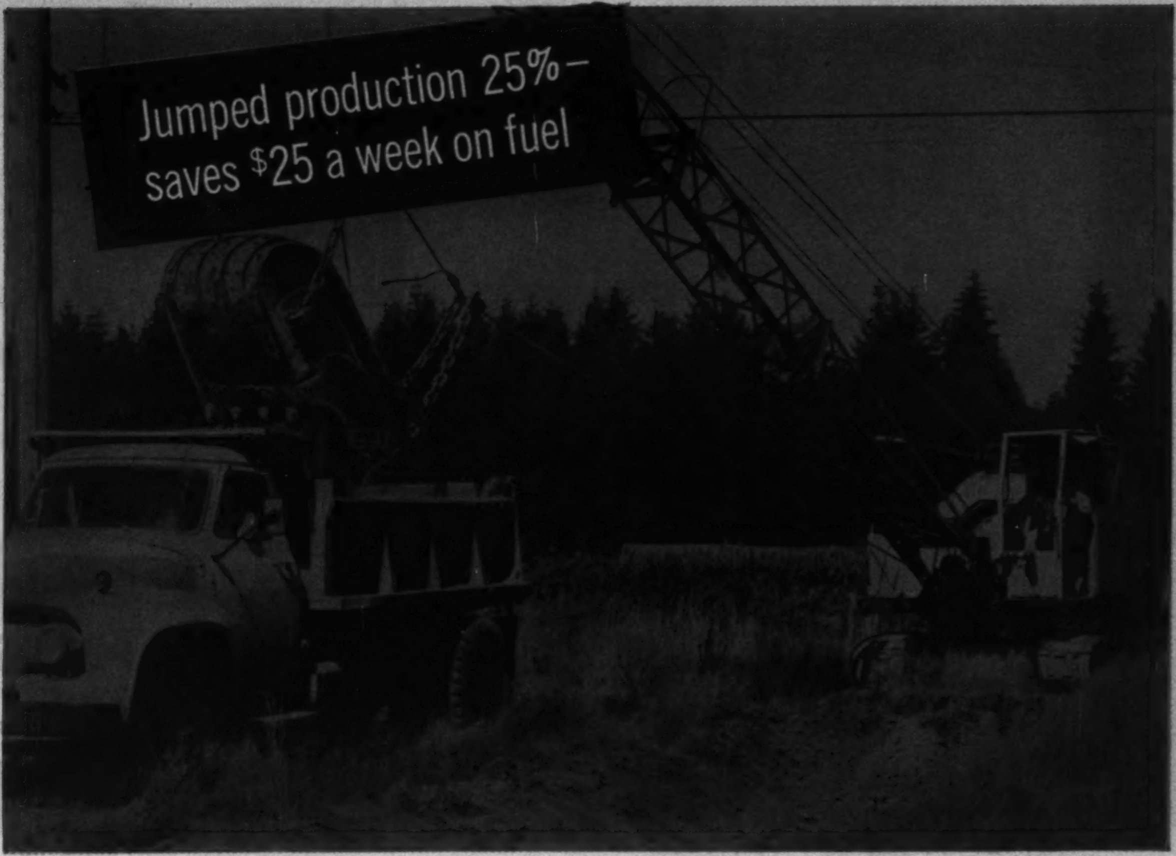

Jumped production 25%—
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Got a gasoline engine in your excavator? Want to save big money and boost production at the same time?

Then take a tip from Chehalis, Washington, contractors Beuter & O'Neil—they replaced the gasoline engine in their Lorain TL-25 with a 4-53 "Jimmy" Diesel.

They're saving $5.10 a day in fuel—getting 25% more work per shift. What's more, the "Jimmy" has ended engine stalling on the job—has "lots of guts" according to the operator, who says he "can't kill it on idle."

And Beuter & O'Neil also say, "We like particularly the fact that the shovel can now pick up heavy stuff at an idle—it doesn't tear the bucket apart. Open throttle with the previous gas engine raised cain with the machine. Now we can hook out riprap at an idle—something we couldn't do with the other engine."

With savings and performance like that, Beuter & O'Neil figure their GM Diesel will pay for itself in less than a year—a bargain any way you figure it. You may do the same thing if you repower with a "Jimmy." Proof? See your GM Diesel distributor—he's in the Yellow Pages under "Engines, Diesel"—or mail the postcard for your GM Diesel Operating Cost Computer today.

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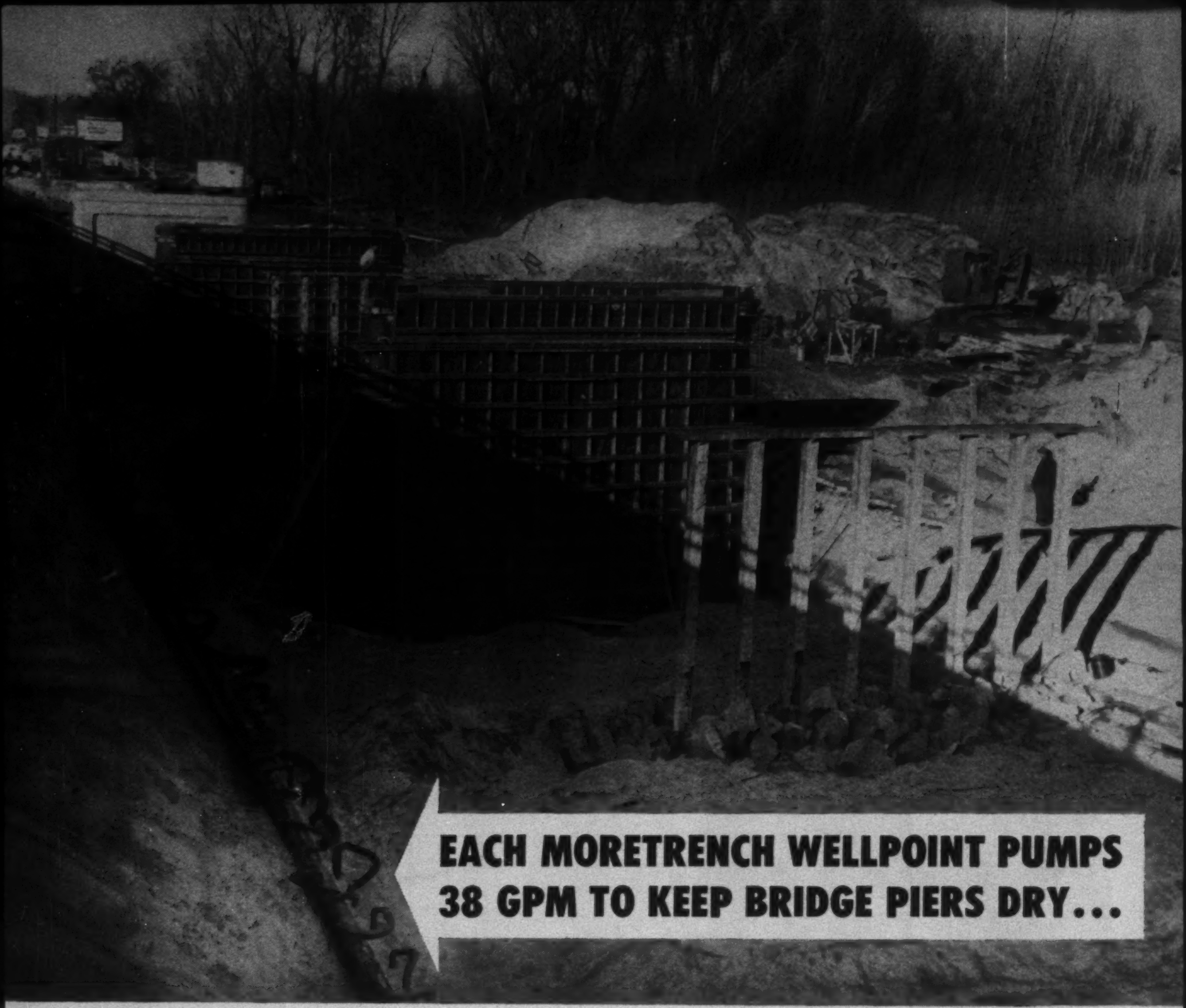

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THE CONSTRUCTION WEEK

BIG YEAR FOR HIGHWAYS—Highway and bridge contracts this year will total more than $4 billion, for the second best year in federal-aid history. Outlook is based on preliminary analysis of results of an ENR survey of state highway department plans. With returns in from all but one state, planned contract awards top 1959's erratic performance by a whopping 26%. (For the complete story, see ENR next week.)

SCRATCH ONE CANDIDATE—You can take Maj. Gen. William A. Carter off that list of possible candidates for Chief of Army Engineers (ENR Mar. 17, p. 17). He's been appointed next governor of the Panama Canal Zone, to succeed Maj. Gen. W. W. (Joe) Potter. General Carter is now Division Engineer in the Lower Mississippi Valley Division and president of the Mississippi River Commission.

FIRST SMITH MOUNTAIN AWARDS—One of two dams and $11.5 million worth of equipment, including reversible pump-turbines, were placed under contract last week for Appalachian Power Co.'s $50-million Smith Mountain hydro project on the Roanoke River in Virginia. A construction start on the 240-ft-high arch awaits a Federal Power Commission license. The second dam, not under contract, will be a 90-ft-high rockfill 17 miles downstream.

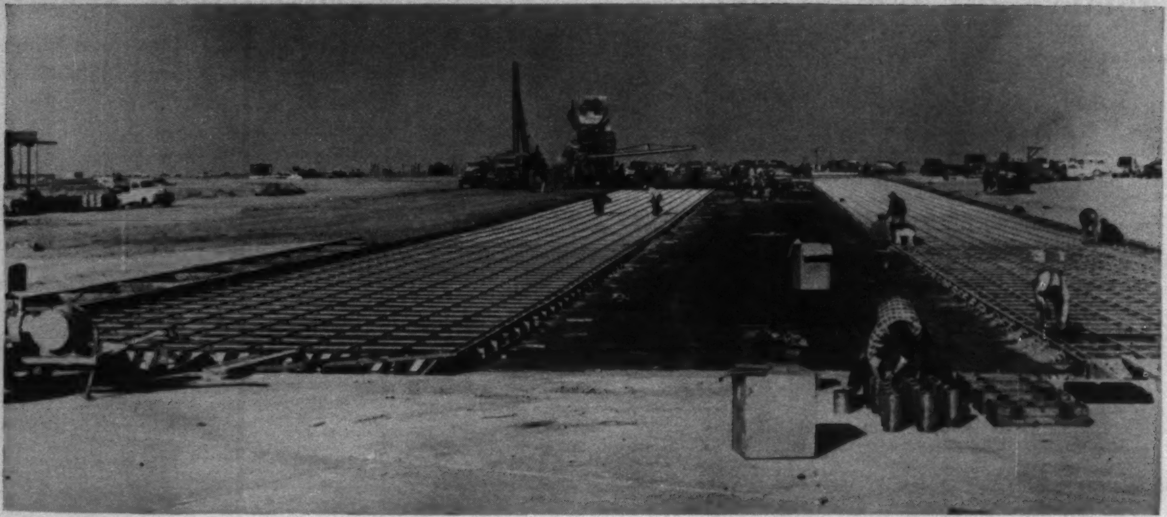
ANOTHER HUDSON BRIDGE—Modjeski & Masters, Philadelphia consultants, have been authorized to begin designing a bridge to cross the Hudson River between Newburgh and Beacon, N. Y. It will be the eighth river span on the stretch between Albany and New York City, 140 miles to the south.

COMPETITION FOR THE FREEWAYS—Construction of a 43.5-mile rapid transit system over five years and an additional 110 miles by 1980 has been recommended to the Los Angeles Metropolitan Transit Authority by consultants Daniel, Mann, Johnson and Mendenhall. Coming in June are DMJM's recommendations on specific alignments along four "corridor" routes, type (or types) of equipment, and costs.

MORE FINNISH PREFABS—Finland's Puutalo Sales Association for Prefabricated Houses hopes to increase exports to the U. S. from 2,000 to 5,000 units annually. The timber houses are priced from $4,400 to $15,200, including lot, at a unit cost of about $10 per sq. ft.

SLUDGE SHIP SETS SAIL—The good ship Bowery Bay made port at the new Yonkers, N. Y., Sewage Treatment Plant last week bearing a cargo of 50,000 cu ft of activated sewage sludge, a gift from the City of New York. The sludge will be used to seed aeration tanks, thereby speeding full capacity operation of the plant by two months.

Another progress report on Ryerson post-tensioning service



New maintenance apron taxiway at the Naval Air Station in Lemoore, Calif. Owner: U. S. Navy. Architect & Engineer: Porter, Urquhart, McCreary & O'Brien, Los Angeles. Contractor: Griffith Company, Los Angeles.

New prestressed slab at Navy Air Base is one of longest post-tensioned projects

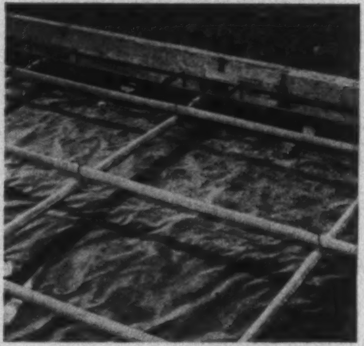
A new maintenance apron taxiway at the Naval Air Station in Lemoore, Calif., is a 512′ x 75′ *continuous ribbon of prestressed concrete.*

A complete "package" of materials and equipment for post-tensioning was furnished the contractor by Ryerson. Included are 30 tendons (each containing eight ¼″ wires) that extend the entire 512′ length of the slab . . . and 205 tendons (with six ¼″ wires) that run the width. This means a tendon every 2½′ in both directions. Stressing force of 150 psi was applied to the slab. Special anchor heads for these tendons, plus stressing and grouting equipment, were also supplied by Ryerson.

The concrete is 6″ deep in the 312′ x 25′ center section, and tapers to 9″ at the edges. If the concrete had not been prestressed it is estimated that a uniform depth of 12″ would have been required to provide equal strength.

Post-tensioning also brought these important advantages: (1) It completely eliminated the need for troublesome transverse expansion joints. Should the concrete crack for any reason, it will immediately seal itself *watertight* because of tensioning. (2) No wire mesh was needed. (3) Re-bars were required only around the edges where load is concentrated.

The taxiway was constructed by Griffith Company of Los Angeles, under the supervision of the U. S. Navy Bureau of Yards and Docks. Captain V. C. Bertelsen CECUSN, Resident Officer in charge of construction.



Close-up of post-tensioning tendons. Note that re-bars are only required along edges of slab at top of picture.

Pouring concrete at one section. Post-tensioning tendons are spaced 2½′ apart in both directions.

This is just one more example of the growing use of post-tensioning for prestressed concrete construction, and of the growing reliance on Ryerson for post-tensioning materials, equipment and know-how. On *your* next project, call your nearby Ryerson plant for details on *any* of our products and services for the construction industry.

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- Needed: 607,600 school rooms by 1970
- Taft-Hartley change inching through House
- Lower FHA down payments coming

● **The shortage of school rooms is going to be a big issue in the 1960 Presidential compaign.** Northern Democrats are pushing for a federal construction program; the Administration is resisting federal aid, and offering, instead, advances to school districts having trouble raising the money.

The controversy is coming to a head. The two approaches will clash in Congress once the House Rules Committee decides whether to send a committee-approved federal-aid bill to the House for a vote.

The Office of Education this week itemized the future need.

It estimates the U. S. will need 607,600 new school rooms during the 1960s. Cost: $26.8 billion. The report, "National Goals in the Staffing and Construction of Public Elementary and Secondary Schools," makes its estimates on three counts: (1) the existing backlog of needed rooms; (2) the abandonment of rooms resulting from obsolescence, fire and other destruction; (3) the booming crop of babies, which will be reaching school age over the next ten years.

The estimates are based on 30 students to a class from kindergarten through eighth grade, a class of 25 in the ninth through 12th years. These estimates make allowance for the expanding curriculum that has become standard—laboratories, libraries, shops and physical education.

The report recommends no way to finance construction. But it does see the need for building 416,600 classrooms in the first five years; and 191,000 in the last five.

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● **The Taft-Hartley legislation proposed by the AFL-CIO Building Trades is half-way through the House, with two hurdles remaining—action by the House Rules Committee and a vote on the House floor.** If the Rules Committee releases the legislation to the House, it will probably permit amendments from the floor—something the bill's proponents had hoped to avoid. The bill would reverse the Denver Building Trades case by easing the restrictions on picketing at construction sites.

It's expected to be several weeks before the Rules Committee acts. Should the House approve this legislation, the Senate is expected to follow suit. The bill has already been approved by the Labor Committee, 21-5.

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● **Lower down payments for FHA housing are in sight.** The Administration is studying feasibility of using authority granted last year by Congress to ease down payments in order to stimulate building. Congress last year permitted the President to decide whether to lower percentages on houses costing more than $13,500.

The Administration is concerned over the slip in housing starts in February. February starts fell under the 1.2-million annual rate considered adequate by the White House.

The liberalization, if full Congressional authority is used, would mean: Down payment on an $18,000 house would drop from $1,380 to $855. On a $25,000 house, FHA down payment would be reduced from $3,480 to $2,955.

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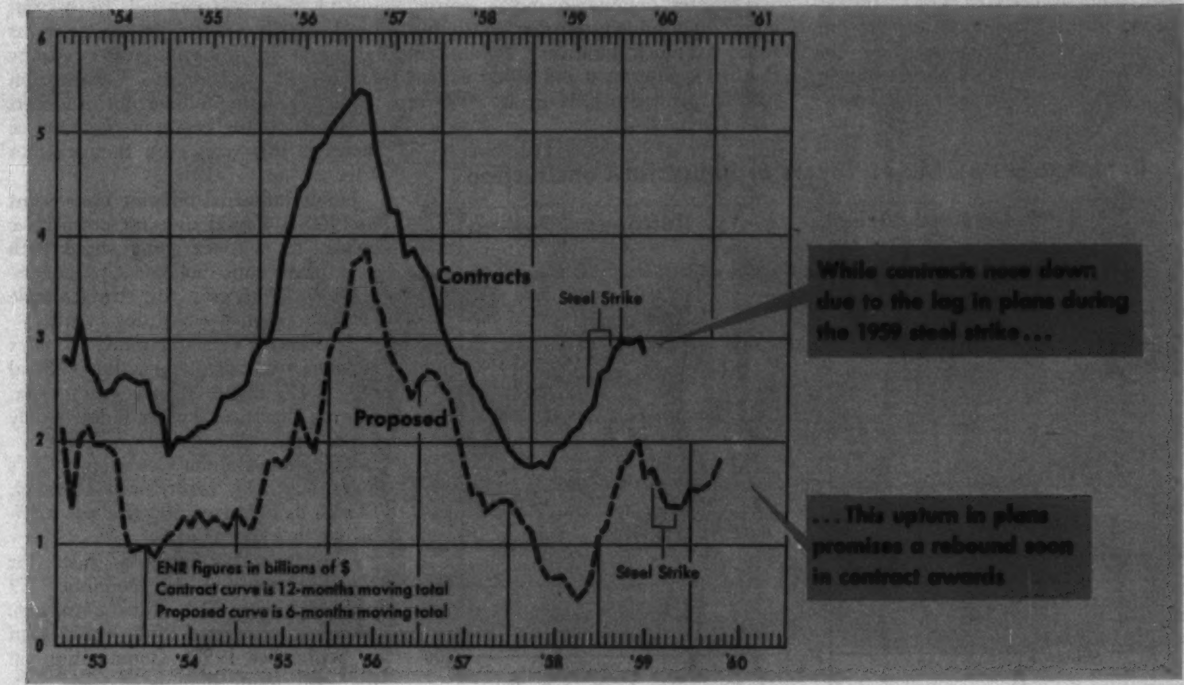


While contracts now down due to the lag in plans during the 1959 steel strike . . .

. . . This upturn in plans promises a rebound soon in contract awards

Plant Construction Plans Zoom

Contractors are now asking the same question put by engineers and architects in the summer and fall of 1959: "Where did everybody go?"

What has many contractors concerned is the drop in industrial building contracts since the steel strike ended.

It's confusing because some contractors had expected the resumption of steel operations to trigger an upsurge in plant construction contracts. But the reverse happened. Industrial contracts reported by ENR in the first quarter of '60 dropped 21% below the unimpressive volume in January-March of last year.

Moreover, March awards sank to $30 million per week, one-third the recent high last September and the lowest rate since the bottom of the 1957-58 slide in industrial contracts.

Meanwhile, surveys of industrial capital spending plans show that businessmen expect to invest more money in new plants and equipment this year than last. Is all of the increase in spending going into equipment, none of it into steel and concrete? The answer is no on two counts:

- A big chunk of this year's capital spending increase will pay for last year's 70% jump in industrial building contracts. Many of those plants won't be completed until 1960, some may take until 1961.
- Industry piled a whopping $1.6 billion worth of future plant construction on the drawing boards in the five months following the end of the steel strike. This is 60% more than the volume of plans initiated during the June-October '59 cutback in proposed work—a cutback starting as the probabilities increased for a steel strike, ending only when a resumption of steel operations appeared imminent.

New proposed plants zoomed to a 16-month high in March. Plants estimated to cost $405 million piled into ENR's Backlog of Proposed Industrial Building, lifting it to a record $17.5 billion.

When these projects clear the planning stage, contractors will find many more industrial building contracts available. Because it takes six months or more to complete plans for new plants and call in contractors, the first impact of the new upturn in proposed industrial building on contractors' new business could come in May. As more and more of the new plans come off the drawing boards, contract volume will rise high and higher. While contractors can pretty well count on more industrial work a month or two from now, they're sure to book a much greater volume of plant construction in the second half of 1960 than in the first half.

ENR forecast 1960 industrial building awards to rise 35% above '59 to $4,045 million this year (ENR Jan. 28, p. 55). To prove out this 1960 forecast, the current surge in proposed plants must continue through June. This will call for renewed confidence in the business outlook. But even more important is the necessity for industry to keep alive plans to update or replace unprofitable plants and distribution facilities. Particularly in industries where sales are down or growing slowest, stiff sales competition gives the edge to the company with the most efficient plants.

Industrial building contracts to date in 1960 indicate that industry is concentrating on profitability rather than basic capacity, which was the theme of the 1955-56 boom in plant contracts. While dollar value of this year's awards is down 21%, the number of plant construction contracts is up by 16% over the first quarter of '59. In fact, the 532 contracts let this year is the largest first quarter total since the 1956 boom.

The chemical process industry, construction's biggest customer again this year, let 42% less dollars worth of contracts in the first quarter than a year ago. But the number of chemical plant contracts jumped 31% above last year. Most other industries are going ahead with more projects in 1960. In fact, public utilities and food are the only major industrial buyers of new construction that have let a smaller number of contracts in 1960 (see table below).

And though total dollar value of industrial contracts is down to date, those industries that have upped their contract volume outnumber those that have cut back.

The steel-dominated metal refining and rolling industry awarded nearly five times as much industrial building in the first quarter as it did a year earlier. And its plant contracts are up 63% in number. This clearly reflects the steel industry's determination to cut production costs by replacing obsolete capacity with more efficient plants. With operations slated for a slower pace in the second quarter—compared to a near breakneck pace in the first three months—the industry needs not greater capacity but greater profitability. Competition among domestic and foreign producers for the U. S. market has precluded price increases this year, even though labor rates are up.

Stable industrial building costs point to 1960 as a good time for prospective owners to consider going ahead with new plant construction. Contractors' selling price indexes have changed little or not at all in the last nine months.

The Turner Construction Co.'s index in January was the same as July '59 and only 0.9% higher than a year earlier. In fact, the latest Turner index is only 1.6% higher than its July '57 value.

The Fruin-Colnon Contracting Co.'s index has held steady since May '59, though its February '60 value was 2.8% higher than a year earlier.

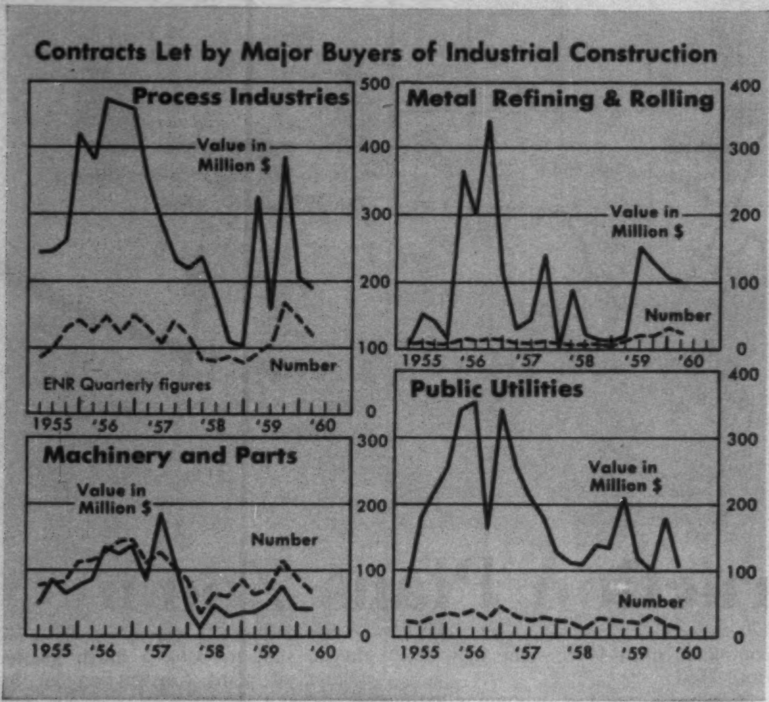
The Austin Company's index for March remains at the December '59 point and is only 1% above a year ago. Moreover, it is only 1.7% higher than in September 1957. Commenting on the "continuing stability that has characterized . . . industral building costs . . . since the fall of 1957," Mr. Harold A. Anderson, executive vice president of the Cleveland-based engineer-constructor company, notes that most factors which influence costs are favoring overall stability in the industrial building market. Materials, manpower and construction machinery are readily available; and no immediate shortages are in prospect. And with manufacturers "resisting price increases . . . companies of all types are in an ideal position to proceed with projects that can be undertaken quickly."

Though companies going ahead with new plant construction have benefited from stable construction costs, they've found financing costs much higher in recent months.

But record depreciation reserves and retained earnings are available for plowing back into needed plants, so industry has called upon outside investors for only a limited amount of construction money this year.

ENR figures show first quarter corporate security sales for construction money tumbling 31% under last year's low volume to the smallest total since 1952.

The sudden slide in borrowing costs in March and early this month is probably temporary. Interest rates are likely to firm up, move back toward their early '60 high as industry finds it needs to borrow more to finance projects now in the planning stage.



Contracts Let by Major Buyers of Industrial Construction

Industrial Building Contracts in 50 States

First Three Months 1960

Reported by ENR. Contracts costing $110,000 or more.

	Dollar Value			Number of Plants		
Industy	1960 (millions)	1959	Chg. %	1960	1958	Chg. %
All Industry	$558.9	$706.6	— 21	532	458	+ 16
ABOVE 1959 DOLLAR VOLUME						
Metal refining and rolling	101.9	21.4	+375	26	16	+ 63
Machinery and parts	39.3	37.3	+ 5	73	66	+ 6
Automotive service	18.7	11.3	+ 66	36	21	+ 71
Automobile	10.6	10.4	+ 2	10	4	+150
Radio, TV, electronics	6.6	4.0	+ 68	10	5	+100
Wood	4.6	1.2	+280	7	5	+ 40
Textiles	2.7	1.3	+106	13	8	+ 63
Foundries	2.2	0	——	3	0	——
Railroad	0.24	0.2	+ 20	1	1	0
BELOW 1959 DOLLAR VOLUME						
Chemical process (a)	190.2	327.4	— 42	122	93	+ 31
Public utilities	106.1	208.6	— 49	14	23	— 39
General	37.1	37.7	— 2	148	107	+ 38
Food	33.7	34.8	— 3	62	85	— 27
Aircraft	4.8	10.4	— 54	9	21	— 57
Refrigeration and cold storage	0.1	0.6	— 75	1	3	— 67

(a) Includes aluminum production facilities.

Soaking wet towns along Missouri River tributaries notwithstanding . . .

Missouri Dams Pass a Big Test

Sudden spring snowmelts that sent U. S. rivers out of their banks during recent weeks have given the Corps of Engineers' string of Missouri River dams their first major test.

The dams passed with flying colors and held the main stem crest below flood stage in some reaches, but it was a wetter tale along the tributaries. And it was cause for second thoughts in a number of communities that had put off too long, or refused to make, the local contribution required to get federally aided flood protection.

Lt. Gen. Emerson C. Itschner, Chief of Engineers, said that $40 million to $50 million in flood damage was prevented in the Omaha-Council Bluffs area alone by shutting off Fort Randall Dam completely and manipulating the Gavins Point Dam to meet day-by-day developments.

The Missouri River at Omaha, where flood stage is 19 ft, crested at 17 ft. Without the dams, the crest would have been 26 ft, General Itschner said.

In the reach below Omaha, tributary inflow built up the river at St. Joseph, Mo., to its second highest level of the century. Completed segments of the Corps' 1,500-mile levee construction program all held and saved 200,000 acres from inundation. In the light of the two existing dams' performance, the Engineers' proposals for a levee system extending from Sioux City, Iowa, to the river's mouth above St. Louis are being re-examined.

Although urban flooding downriver from Omaha was negligible, more than 100 breaks in local levees did occur, inundating more than a half-million acres of farmland.

Individually, flooding streams have been higher in the past. But the number of tributary streams and the area simultaneously involved put this year's floods in the 100-year category. Twenty-one major tributaries, as well as the Missouri itself, were flooding at the same time.

This widespread tributary flooding emphasized the Corps of Engineers' frequent warning that a river basin cannot be adequately safeguarded without protective works on tributary streams.

Most striking example of this was along the Elkhorn River in Nebraska. Twelve years ago the Corps proposed flood protection works costing $3.1 million for 10 key cities on the stream. The program was contingent upon local communities' providing $1 million in rights-of-way and maintenance costs.

Before the projects were even authorized, four communities—Hooper, Winslow, Tilden and Meadow Grove—asked to be counted out because of local cost.

Projects were authorized at Norfolk, West Point, Scribner, Pierce, Battle Creek and Waterloo. But necessary local appropriations were delayed and the projects were high and dry on the drawing boards when this year's floods hit. These communities were among those that suffered the most damage.

Similarly, in Sioux City, where the Floyd River cuts through the heart of the city's industrial zone, protection plans were drawn up after the 1953 floods took 14 lives and caused $23 million worth of damage.

Prolonged debate and inaction so delayed the project that not until this year was an actual budget proposal of $761,000 made. This, of course, failed to circumvent the evacuation of 2,000 persons as the Floyd River once more flooded Sioux City.

Where tributary protection works were built, they performed efficiently. The $15.5-million Little Sioux project, now 50% complete, held this year's high water.

Likewise, a recently completed bypass, which diverts the Big Sioux around Sioux Falls, S. D., saved that city, a frequent flood victim in the past.

Here's What Delegates to Three

1. More Rigorous, Uniform Building Standards

The Building Research Institute Spring Conference in New York City last week stressed solid groundwork rather than imaginative flights into the future. The need for better planning, clearer definitions of research problems, and more rigorous, uniform standards were recurring themes throughout the conference.

The need for better reporting of technical data by plastics manufacturers resulted in the "General Format for Plastics in Building" prepared by a BRI task group. William F. Reardon of the General Electric Co. presented the format before the Plastic Information Workshop session.

The format comprises an outline to guide manufacturers in tabulating information about their products. The outline's seven major headings: product description; physical properties; design criteria; installation; maintenance; economies; and case histories.

Other members of the task group presented recommended formats for plastics materials information on exterior wall components, interior partitions and wall coverings, plastic pipe, floors, ceiling components, and acoustic materials. For exterior plastic sandwich wall panels, for example, manufacturers following the format would supply data on fire-rating, compression strength, installation tolerances, description of installation procedure and equipment required.

Cooperation between architect, engineer, contractor and operating engineer should be extended beyond the planning and construction stage, said Robert W. McKinley of Pittsburgh Plate Glass Co. The construction team would meet on building anniversaries to inspect and evaluate the job in a "review and schedule" report.

These post-construction meetings would serve two purposes: Aid the construction team in planning future projects; provide a source of field performance information to guide the work of research committees.

George R. Bailey, president, Chicago Building Owners and Managers Association, generated audience enthusiasm with his talk on commercial office buildings. Mr. Bailey discussed the changing trends in building design and their impact on future planning. Modern lighting and air-conditioning have doubled the dimension of premium space measured from exterior walls since the days when tenants relied more on windows to provide light and air. This permits higher ratios of rentable floor space. Good design will produce a ratio of about 75% between rentable floor area and total floor area, a figure sometimes not achieved in current design. Mr. Bailey also recommended floor areas of at least 10,000 sq ft.

Other recommendations made by Mr. Bailey included use of revolving doors rather than hinged doors to maintain interior temperatures. He also advocated pivoted rather than fixed window sash because of fire hazards and the need for access from outside scaffolds in emergencies.

The speakers at the session on structural timber lamination reached a concensus on this point: major need in their industry is a lower-cost, waterproof adhesive. Phenol resorcinol and resorcinol adhesives now used for this purpose cost three times as much as the casein adhesives used for unexposed timber.

Growing timber shortages have led to edge and end gluing to build up laminated timber sizes. This intensifies the need for better, more economical adhesives.

Maurice J. Rhude, chief engineer of Unit Structures, Inc., said that research for this ideal adhesive should aim at satisfying requirements of structural lumber, not at satisfying general requirements of a multi-purpose adhesive that could also serve to bond plywood laminations.

Cavity walls have proven to be effective means of insulating and waterproofing exterior walls, according to Clarence B. Litchfield, partner in the architectural firm LaPierre, Litchfield & Partners of New York City. Field observations of many buildings in different climatic conditions have shown cavity walls satisfactory. In an 11-story medical building in Baghdad, top ventilation of the cavity was introduced to allow air movement and consequent cooling of the walls.

The session on paints and coatings ranged from improvements in brush manufacture, through procedures in sand-blasting metallic surfaces and proper air-pressures for spray applications, to the work rule provisions in contracts of the Brotherhood of Painters, Decorators and Paperhangers of America.

2. Lighter, Faster, Cheaper Earthmovers

Despite the high level of development of earthmoving equipment, contractors want it to be even better. They want it to be more rugged yet lighter in weight, easier and safer to operate, more productive with increased power, easier to maintain and repair, more dependable with less "down-time," and less costly to own and operate.

This adds up to a mighty big order, but those engineers whose job it is to develop and design earthmoving machinery believe they can deliver the goods.

At least that was the general feeling at the 11th annual Earthmoving Industry Conference last week in Peoria, Ill. The two-day meeting, which drew a record-breaking registration of 1,800, was sponsored by the Central Illinois Section of the Society of Automotive Engineers.

The well balanced program was a two-way exchange of ideas, with no punches pulled. The equipment designers learned what is needed for both civilian and military construction. In return, the designers presented some of the latest thinking on improved equipment.

These discussions covered such items as the potential of gas turbines in off-highway equipment, electrical and remote control systems, cold weather starting of diesel engines, the fuel-cell power plant for a prime mover, and electronic computers in the earthmoving industry.

One session of the conference was devoted to a five-man panel discussion. Although the lively session was billed as equipment requirements "during the next decade," the hard-hitting contractors left no doubt in their listeners' minds that "the sooner this improved equipment is available, the better for all concerned."

One of the greatest needs is increased dependability of operations and less down time, said an Ohio contractor on the panel. Of equal, if not greater, importance is safety. This means brakes that will hold, transmissions that won't jump out of gear at dangerously critical times, and foolproof operation and controls.

One panel member predicted a definite trend toward increased horsepower to-weight ratio in the next dec-

Technical Conferences Ask for . . .

ade. Individual earthmoving units will become more efficient, he said, and the use of automatic transmissions will become more widespread.

Hydraulic and electric power applications will increase considerably. Operator comfort will continue to be a major factor in design.

As earthmoving equipment becomes more efficient, it will also become more complex. This, in turn, will increase the difficulty of adequate preventive maintenance.

More emphasis should be placed on "unitized design" of component parts. Manufacturers should assume more responsibility by having trained personnel available to help contractors with their field repair and servicing. In some areas, repair depots provided by manufacturers in conjunction with their distributors, would be a profitable undertaking from the standpoint of customer service.

One panel member, a hard-rock contractor from New York, looks for a packaged nuclear power plant for earthmoving equipment to be developed and made available during the next decade. Other new fuels will also be developed, possibly solid fuels.

There will be an increase in usage of all-wheel power drives, as well as individual wheel suspension. Operating controls will be simplified and made more nearly foolproof.

Earthmoving equipment of the future will have fewer moving parts. As operator labor costs increase, equipment must be more powerful and more productive per man-hour of operation.

More attention should be given to designing adequate structural strength into earthmoving equipment, said one panel member. Rubber tires for this equipment should be made more durable with longer service life, since they are an expensive item. As the capacity of earth-hauling equipment increases, the units should be lengthened, not widened. The reason: Wider truck bodies mean wider and more expensive haul roads to construct and maintain. And while we're at it," said one panelist, "let's develop a dump truck body that is really self cleaning in wet, heavy muck."

Army Engineer requirements for earthmoving and allied equipment in combat areas offer high challenge to machinery designers and manufacturers, declared Lt. Gen. E. C. Itschner, Army Chief of Engineers, keynote speaker at the conference. The reasons are obvious: "Dispersed operations, rapid movement and the effects of atomic destruction will magnify the number and difficulty of engineer tasks," he said.

"At the same time, Army Engineer units will be spread over larger areas. Our combat battalions will require specialized earthmoving equipment for work in the forward battle areas. It must be efficient, fast moving and versatile. It must also stand up under hard usage and must not require heavy logistical support."

3. Lower Cost Remote Nuclear Plants

Civil engineering aspects of nuclear power came to the fore in several papers presented at the 1960 Nuclear Engineering and Science Conference held last week in New York City. These dealt mainly with site selection, containment and construction of low-cost, portable power plants.

Col. Donald G. Williams, chief, Army Nuclear Power Program, described a "versatile family of nuclear power plants" now under development.

The plants range in power from 100 kw to 40,000 kw. Some are designed to be stationary, others are for transportation by air, barge or truck. Their principal military advantage is self-sufficiency. Principal disadvantage: high initial cost. Capital cost of an Army nuclear plant under construction in Alaska, for example, is about three times that of a diesel plant of the same capacity.

One of the major objectives of the Corps of Engineers is to reduce costs of remote plants, primarily by reducing the amount of high-cost on-site construction. A portable 1,500-kw plant now being built will be ready for transportation from factory to site by air in about 15 months.

Construction will take about three months, compared to the 15 or 18 months required for the stationary plant at Ft. Belvoir, Va.

The Navy's Bureau of Yards and Docks is promoting development of nuclear power plants for use at various naval bases, particularly for such remote areas as Antarctica and Guam. The plants being studied may be mounted on barges, on movable, self-elevating platforms or on skids, for polar regions, reported Cmdr. Wayne J. Christensen.

Preliminary estimates indicate that nuclear power may be less expensive than diesel in the Antarctic.

In selecting a site for a plant, civil engineers must consider the usual parameters. However, the various factors must be weighed differently, said R. W. Kupp, chief nuclear engineer, and J. C. Tourek, vice president of engineering, Vitro Engineering Co., New York City.

A power plant of any type should be near the center of the electrical load, have an adequate water supply, good geological conditions, low land cost and a sufficient labor supply. Because of the large area required for exclusion (protection against accidents), however, land cost is more important for a nuclear plant. Also, more consideration must be given to groundwater conditions, possibility of earthquakes, weather conditions and population density.

To keep costs down, alternates to steel containment vessels are being studied. But it is difficult to meet the specification calling for less than 1% leakage at a significant pressure. Prestressed or reinforced concrete tanks, above or below grade, are under consideration.

However, these have not yet been tested. Another approach is inclusion of a quenching system to reduce pressures considerably, making possible a containment structure less tight.

The heavy shields required for nuclear reactors also present tough design and construction problems, Mr. Kupp and Mr. Tourek said. At Indian Point, N. Y., for example, the concrete dome roof over Consolidated Edison's reactor is 33 in. thick and spans 170 ft (ENR Mar. 17, p. 43). The dead load is about 400 psf. As many as nine different framing schemes were studied to find a construction that would be satisfactory both from cost and functional viewpoints. The design chosen consists of inverted T, precast concrete ribs and precast planks.

Another major concern of civil engineers in nuclear work is waste disposal. Corrosion and fission products are the two major sources of pollution. The majority of these products are removed by filtration and ion disposal. Also, some degasification is employed. The "hot" contaminants are stored in shielded tanks until they lose enough radioactivity to be safe or they are encased in concrete and dumped in the ocean.

The 1960 Nuclear Congress was sponsored by Engineers Joint Council. It was held in conjunction with the International Atomic Exposition, which featured over 150 exhibits, and a conference of the Society of Automotive Engineers on nuclear propulsion in aircraft.

New Shingles for 'Seasick' Bridge

A new layer of shingles for a suspension bridge is one of the maintenance projects scheduled for this summer by the Maine State Highway Commission.

The shingle job is part of a $30,000 restoration on a 200-ft bridge that cost only $3,624.97 to build in the 1860s.

The commission, along with county and municipal agencies, will do the refurbishing job on the Wire Bridge, which spans the Carrabasset River at West New Portland.

The Wire Bridge is the same as any suspension bridge in principle, except that the hangers from the two main cables are attached not to longitudinal girders, but to wooden crossties that support 3-in. plank flooring.

Each pair of hangers with its crosstie is independent of the others. A load exerting a downward pull on one pair of hangers causes an upward pull on hangers elsewhere on the bridge. A vehicle crossing the bridge produces a pronounced rippling motion of the deck that makes some drivers seasick.

The bridge's suspension cables are 3 in. thick, made up of ⅛-in. wires. The hangers are ⅜-in. wires. The 8x8-in. crossties and hangers that support them are on 2-ft centers. The bridge is 14 ft wide and has a maximum load rating of 8,000 lb.

The bridge's towers are timbers encased in board siding and wooden shingles. This protection from the weather has kept them sound. The 25-ft-high towers stand on stone abutments that will be replaced by concrete.

Other restorations will include new siding for the towers, new hangers and new flooring. The commission will install a timber curbing designed to stiffen the bridge and reduce the incidence of nausea in southern Maine.

Nuclear Still and Smog Can't Mix

Opposition from an unexpected quarter appears likely to force the Interior Department to look for another West Coast site for its thermonuclear seawater distillery.

The Atomic Energy Commission's Advisory Committee on Reactor Safeguards has ruled out the Point Loma, Calif., site because of weather conditions that pose a potential threat.

Plans to build at Point Loma had already drawn fire from the Navy (ENR Mar. 17, p. 28), reportedly because of fear on the part of the Navy that its planned Nuclear Submarine Base nearby might be blamed for any nuclear leakage occurring at the reactor.

Prime factors influencing the AEC committee to reject the site are San Diego's big population and a local temperature inversion, which traps volumes of air for days and causes smog.

Smog resulting from the inversion would seriously compound radiation buildup in case of an accident, the committee reasoned.

The rejection may reopen Interior's consideration of two other California sites—Port Hueneme and Camp Pendleton. However, it could cause Interior to give up the idea of nuclear heat for the time being. One staff member of the Department remarked: "If the trouble with reactor sites keeps up, we simply won't bother with nuclear heat. We'll put up our distillation plant using conventional steam and never mind the reactor."

Construction was scheduled to begin at Point Loma this month.

Which Way Across?

Three tunnels and a bridge backed for English Channel

The revival of plans for a tunnel under the English Channel between England and France gained momentum last week as one international consortium offered three tunnel construction proposals. Another international group submitted plans for a bridge over the channel.

A joint venture—composed of Hyperion Constructors, Los Angeles; Kaiser Engineers and Constructors, Inc., Oakland, Calif.; Enterprises Campenon Bernard, France; and Richard Costain, Ltd., Great Britain—submitted proposals for three different trench tunnels. They say they can build any one of the three in three and one-half years.

Merritt-Chapman & Scott Corp., New York; Dorman Long, Ltd., Great Britain; and Compagnie Francaise d'Entreprises, France, jointly proposed to build a 110-ft-wide bridge over the English Channel (ENR Apr. 7, p. 17).

Both consortiums submitted their proposals to the Channel Tunnel Study Group, an American-British-French organization that has been promoting the project since 1957 (ENR Mar. 31, p. 25).

The Tunnel Study Group turned in a feasibility report on the channel tunnel to the governments of Great Britain and France on March 31. The report recommends construction of twin railway tunnels, either by boring or by the trench-tunnel method. Release of the report by the two governments is expected any day.

The three tunnel proposals include a 41-ft-dia tunnel that would cost $203 million, a 44-ft-dia tunnel costing $215 million, and a 53-ft-dia tunnel for $269 million.

In the first two of the three tunnels, motor traffic would be handled on specially designed rail cars in conjunction with normal rail traffic. The third tunnel plan would have two tracks on each of two levels with the upper level handling motor transport.

The proposed bridge over the English Channel would link Sangatte, near Calais, with South Foreland, near Dover. Its total length, including approaches, would be 25 miles. It would cost $560 million to build.

The channel bridge would have 142 piers to carry two spans of 1,500 ft and others of 740 ft. Height above the water would vary from 170 ft to 230 ft. The piers, elliptical in shape, would be made of precast, reinforced concrete rings superimposed on one another.

The bridge would have five lanes for motor traffic, two railway tracks and two lanes for bicycles and motorcycles.

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And new SUPER ROAD LUG takes the aggravated flexing caused by huge loads jouncing over rough terrain—thanks to its tough body built with 3-T (nylon or rayon) Processed Cord. This famous cord, triple-tempered by the exclusive Goodyear process involving Tension, Temperature and Time, has matchless strength and stamina.

Get onto the new performance and savings you'll have with this new super-tough SUPER ROAD LUG. Call your Goodyear dealer—or write Goodyear, Truck Tire Dept., Akron 16, Ohio.

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Where Key Bills Stand in Congress

Construction legislation is making headway this year despite Democrat-White House conflicts. The President has relaxed his economy clamp slightly to admit some new public works projects, but he is holding tight against Democratic expansion proposals.

In the first test between the two, President Eisenhower gained strength when the House sustained his veto of the bill to step up aid for treatment plant construction.

Bloodied but unbowed by their defeat on pollution control, the Democrats are stoically pushing other programs—to aid schools, housing, depressed areas and the like. They want to make a clear-cut record of opposing philosophies this year, and they don't mind sending bills to the White House for almost certain vetoes.

Moves in this direction will be speeded up after the brief Easter recess. With civil rights action completed, the majority will try to make such hay as it can in what is left of a six-month, election-year session.

Military Authorization: Authorizes $1.1 billion of military construction for Defense Department.
Status: Passed by House, in Senate Armed Services Committee.
Outlook: Certain.

Military Appropriation: Appropriates $1.2 billion for military construction in fiscal '61.
Status: Hearings under way before House Appropriations Committee.
Outlook: Certain.

Highways: Authorizes $925 million a year of federal-aid funds for ABC systems in fiscal '62 and '63.
Status: Approved by House Public Works Committee.
Outlook: Certain.

Housing: Authorizes purchase with Treasury funds of $1 billion of FHA and VA mortgages to stimulate construction of middle- and low-income housing.
Status: Rule granted for House vote.
Outlook: Veto certain.

College Housing: Authorizes $250 to $500 million for low-interest loans to colleges.
Status: In Senate Banking subcommittee.
Outlook: Little chance, Administration opposes it.

Urban Renewal: Appropriates $17.5 million of supplemental $50 million requested to pay cities amounts due this fiscal year under capital grant contracts.
Status: Agreed to by House-Senate conferees.
Outlook: Certain.

School Construction: House bill authorizes three-year, $975-million program of aid to school districts for construction; Senate bill, $1.8 billion in two years for construction and teachers' salaries.
Status: Senate passed its version; House bill approved by Education Committtee.
Outlook: No chance, Administration opposes.

Federally Impacted Schools: Appropriates $63 million for school construction in districts burdened by federal influx.
Status: Voted by House, in Senate committee.
Outlook: Certain.

Hospital Construction: Appropriates $150 million for grants to local hospitals, $24 million above budget request.
Status: Voted by House, in Senate Appropriations Committee.
Outlook: Certain.

Civil Works: Appropriates $935 million for Corps of Engineers civil functions.
Status: Appropriation hearings now on.
Outlook: Certain.

Reclamation: Appropriates $310 million for Reclamation Bureau work in fiscal '61.
Status: Appropriation hearings now on.
Outlook: Certain.

Depressed Areas: Senate bill authorizes $375 million of loans and grants to chronically unemployed areas; House version, $235 million.
Status: Passed by Senate, approved by House Banking Committee, in Rules Committee.
Outlook: Veto certain.

AEC Authorization: Authorizes $169 million of new construction for Atomic Energy Commission in fiscal 1961.
Status: Hearings nearly completed by Joint Committee on Atomic Energy.
Outlook: Certain.

AEC Appropriation: Appropriates $215 million for fiscal '61 plant construction by Atomic Energy Commission.
Status: Appropriation hearings under way.
Outlook: Certain.

Public Works: Authorizes $640 million of projects for rivers and harbors, flood control and reclamation.
Status: Passed by House, hearings before Senate Public Works Committee to be scheduled soon.
Outlook: Certain.

Sewage Treatment: Appropriates $45 million for aid to new local plants, $25 million higher than Administration's cutback figure.
Status: Passed by House, in Senate committee.
Outlook: Certain.

Fryingpan-Arkansas Project: Authorizes transmountain diversion and irrigation project in Colorado.
Status: In Senate and House Interior committees.
Outlook: No chance this year.

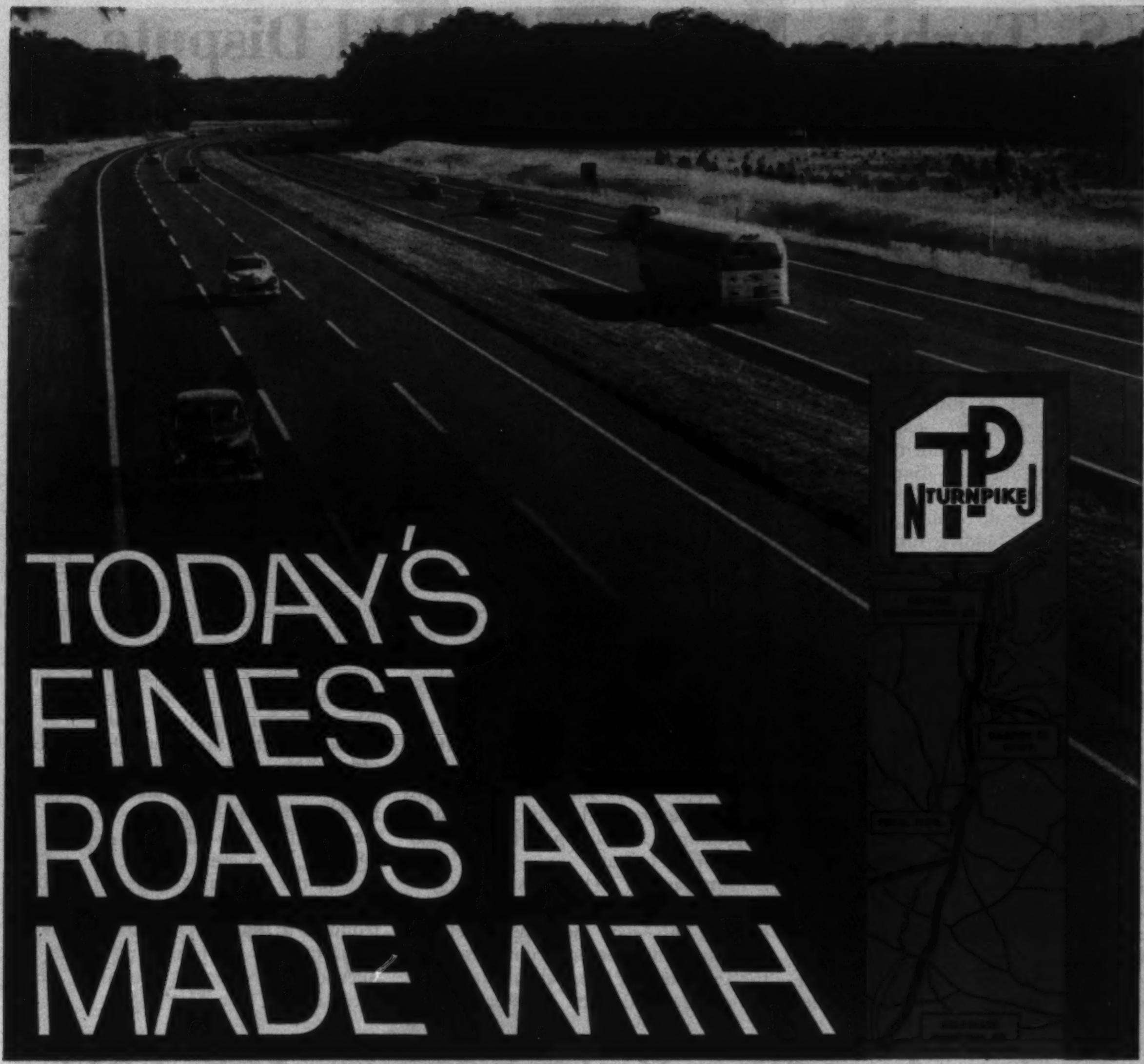
Knowles Dam: Authorizes $235-million multiple-purpose project on Flathead River, Montana.
Status: Hearings held by Senate Interior subcommittee.
Outlook: Little chance.

San Luis Irrigation: Authorizes construction of $290-million San Luis unit of California's Central Valley Project.
Status: Passed Senate, House bill approved by Interior Committee is pending before Rules Committee.
Outlook: Good.

Amistad Dam: Authorizes negotiation with Mexico for joint construction of Amistad (Diablo) Dam on Rio Grande River.
Status: More hearings to be held by House Foreign Affairs subcommittee.
Outlook: Dim for this year.

Burns Creek Dam: Authorizes construction of $45-million reclamation project in Idaho. Funds to start construction voted last year, subject to authorization.
Status: Passed by Senate. House hearings completed by Interior subcommittee.
Outlook: Uncertain.

Labor: Amends Taft-Hartley Act to permit on-site picketing by construction unions.
Status: Approved by House Labor subcommittee.
Outlook: Uncertain.



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U.S. Turbine Maker Wins Bid Dispute

Baldwin-Lima-Hamilton Corp. has won its battle with English Electric, Ltd., over the legality of its $6,392,000 bid for eight hydro turbines for Glen Canyon Dam (ENR Jan. 14, p. 108).

Comptroller General Joseph Campbell has ruled that Baldwin may qualify as a bidder for the turbines, even though the company did not follow the specifics of a bid form in the invitation. The form, was erroneous, not Baldwin's bid, Mr. Campbell said.

This controversy is just one more in the growing list of disputes between foreign and domestic manufacturers bidding for U. S. government contracts under terms of the Buy American Act.

The question in this case was whether Baldwin-Lima could qualify as a "domestic" firm in bidding on the Glen Canyon turbines. Under "Buy American," domestic firms get a price advantage ranging from 6% to 12% when competing with foreign concerns. The larger advantage of 12% is given if the domestic firm is located in a "labor distress" area.

To qualify as domestic, however, a firm must prove that it will perform or supply at least 51% of its work in the U. S. and it was on this issue that English Electric appealed. The British firm protested that Baldwin-Lima had not qualified because it failed to follow specific instructions in a Form (7-1480) used by the Bureau of Reclamation to determine the percentages of foreign and domestic work.

Baldwin stated in its bid that it proposed to subcontract 42.7% of its work to a Belgian firm—still qualifying it under Buy American terms. English Electric challenged Baldwin's figures, claiming that if Baldwin had followed the specific instructions in the form, it would have been forced to show that at least 55% of its work would be done in Belgium, only 45% in the U. S. By this calculation, the company could not qualify for the Buy American price advantage.

English Electric was the lowest unevaluated bidder for the turbines—$6,214,552 as against Baldwin's bid of $6,392,000. But raising the English company's bid by a minimum of 6% under Buy American would make Baldwin the unevaluated low bidder.

Baldwin admitted that it hadn't followed the specifics of the Reclamation form, but that it had followed the provisions of the Buy American Act and a subsequent Executive Order covering the 6% differential. Baldwin charged that the form was in error, and that its bid shouldn't be prejudiced for failure to comply with an erroneous form.

The battle lines quickly formed, extending from the Denver Reclamation office, where bids were opened last December, to the Interior Department in Washington. In January, the matter was dumped in the lap of the General Accounting Office.

From January to the present, the Reclamation Bureau has delayed awarding of the bids—even held up accepting bids on other similar contracts—until the Comptroller General ruled. One of the contracts delayed by Reclamation was bidding for three 50,000 hp hydro turbines at Flaming Gorge Dam, Utah.

Now that GAO has ruled, Reclamation will once again review the bids, and should make an award shortly. The Baldwin-Lima bid is in a position to qualify as lowest.

Specifically, GAO ruled that failure to follow an erroneous provision in the invitation did not disqualify Baldwin-Lima as a bidder. However, GAO notes that this provision didn't relate to the type or quality of equipment it would accept; it was a technical question that wouldn't change design or specification of products.

Mr. Campbell said that he saw no grounds for prejudice against other bidders in the Glen Canyon invitation when he ruled in favor of Baldwin-Lima, as long as the award is made in accordance with law. He added that English Electric was wrong in suggesting it might have made a different bid had it known the bidding rules were different. Mr. Campbell also threw out the idea of junking all bids because "the undesirable aspects of such a course of action far outweigh any possible advantage to the government."

On several other claims by English Electric that Baldwin-Lima failed to meet technical specifications in the invitation, Mr. Campbell said: "It is the view of the Bureau of Reclamation that these requirements can and will be required to be met by Baldwin-Lima-Hamilton. . . . We have no reason to question the Bureau's technical judgment in this area."

Lumber-Grading Rule Eased—for Now

The Federal Housing Administration has eased the impact of its new grade-marked lumber requirement. Instructions being received this week at FHA field offices permit exemption from the requirement on new houses for which commitments were issued prior to April 1, effective date of the regulation.

FHA estimates that from 50,000 to 60,000 housing units will be eligible for exemption under the amended ruling. All FHA mortgage commitments written since January 31 have required use of grade-marked lumber in the houses. Commitments for more than 60,000 units have been issued between January 31 and April 1.

The agency modified the new rule to relieve local situations where lumber dealers have not yet built up adequate stocks of grade-marked lumber.

The modification will probably prove of greatest benefit to Atlanta area builders. There, a shortage of grade-stamped pine lumber had pushed 2x4 prices to $100 per Mftbm, an increase of $15. By the time builders have used up their pre-April 1 housing commitments, ample stocks of grade-marked lumber will be available for housing being built under commitments given after April 1.

There is a different situation in Dallas. Homebuilders will no longer be able to use lumber trucked in from local portable mills. Instead they will have to pay $103 per Mftbm—$23 more—for 2x4s shipped from distant mills licensed to grade-mark lumber under Southern Pine Producers Association standards.

Other areas of the country apparently will experience few difficulties. Fears that large quantities of Canadian lumber would be kept off the U. S. market by the new FHA grading requirements have vanished. Canadian mills are apparently meeting U. S. grading standards with little, if any, difficulty.

And Pacific Northwest lumber producers say supplies of domestic graded fir framing lumber have been built up in most areas.

Possibility of price increases is also being discounted. H. V. Simpson, executive vice president of the West Coast Lumbermen's Association says at least 95% of all lumber produced in the Douglas fir region of Washington and Oregon already was graded standard and better. Extending the grading practice to the utility material used in framing is being accomplished easily. Only the smaller mills are expected to encounter problems under the new regulations.

ENR's Lumber Demand Indicator shows, however, that some upward price moves are impending. But wide moves are not yet indicated. A pickup in homebuilder demand is the reason.

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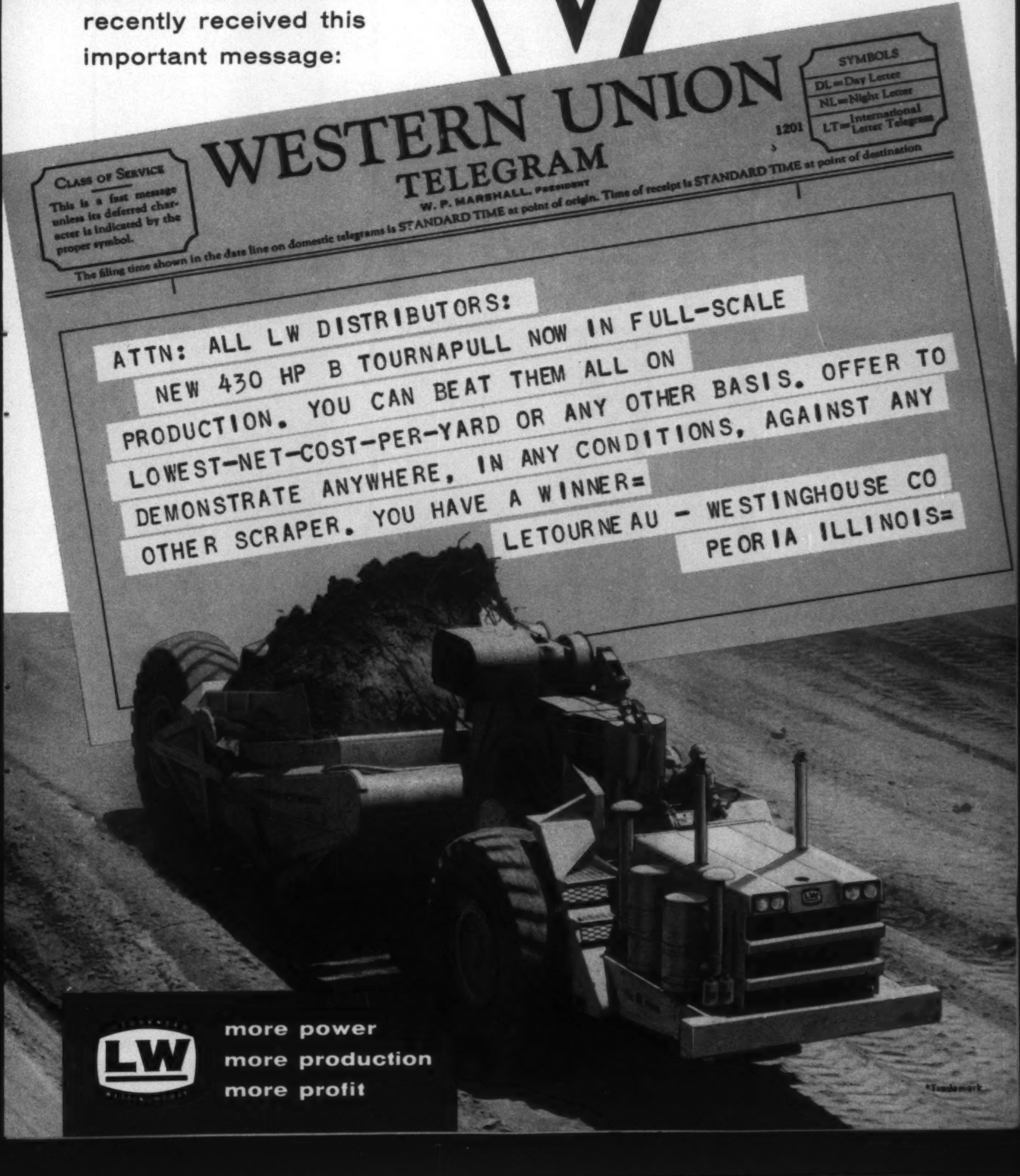

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ATTN: ALL LW DISTRIBUTORS:
NEW 430 HP B TOURNAPULL NOW IN FULL-SCALE PRODUCTION. YOU CAN BEAT THEM ALL ON LOWEST-NET-COST-PER-YARD OR ANY OTHER BASIS. OFFER TO DEMONSTRATE ANYWHERE, IN ANY CONDITIONS, AGAINST ANY OTHER SCRAPER. YOU HAVE A WINNER=
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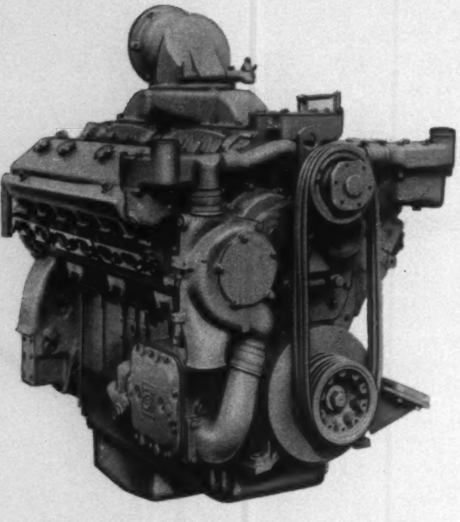

12V-71 GM engine is a 2-cycle, 12-cylinder unit producing 430 horsepower at 2100 rpm, maximum torque of 1210 ft.-lb. at 1200 rpm.

NEW POWER!

430 HP: to lick ANY job condition

NEW SPEED!

31.7 MPH + 2-speed steer for more cycles per hour

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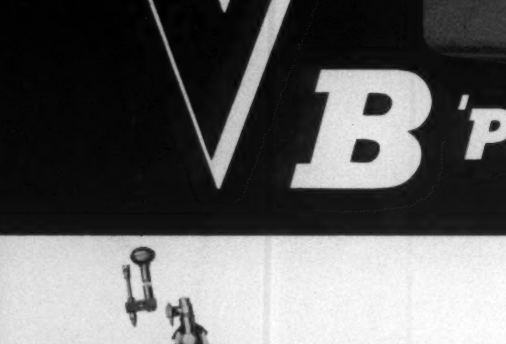


Easy-shifting Fuller L-1550 with LW High and Low Range is rugged, reliable; offers 10 speeds to 31.7 MPH, self-lubrication, pressure-filtration.

NEW CAPACITY!

23 yds struck, for more pay-yardage per shift

NEW STRENGTH!

Super-sized final drive for low upkeep, long life

Standard engine on the B Tournapull® is now the General Motors GM 12V-71, producing 430 horsepower at 2100 rpm. That's POWER! Power to pick up heaping payloads fast, no matter how tough the material. Power to get out of the cut *fast*, no matter how steep the grade. Power to *accelerate* faster, to chop off *minutes* from haul-time, and to return at *top-rated* speed.

Best power-to-weight ratio in its class

Every "horse" on the new V-Power "B" has to power only 320 lb of loaded weight. That compares to an average of 390 lb per horsepower among other single-engine scrapers in its size-class! You also get the best horsepower-per-struck-yard rating of any single-engine scraper on the market today. The V-Power "B" gives you 18.7 HP per yard, compared to an average of 16.2 among seven other scrapers in its range.

Even "hotter" than the V-Power "C"

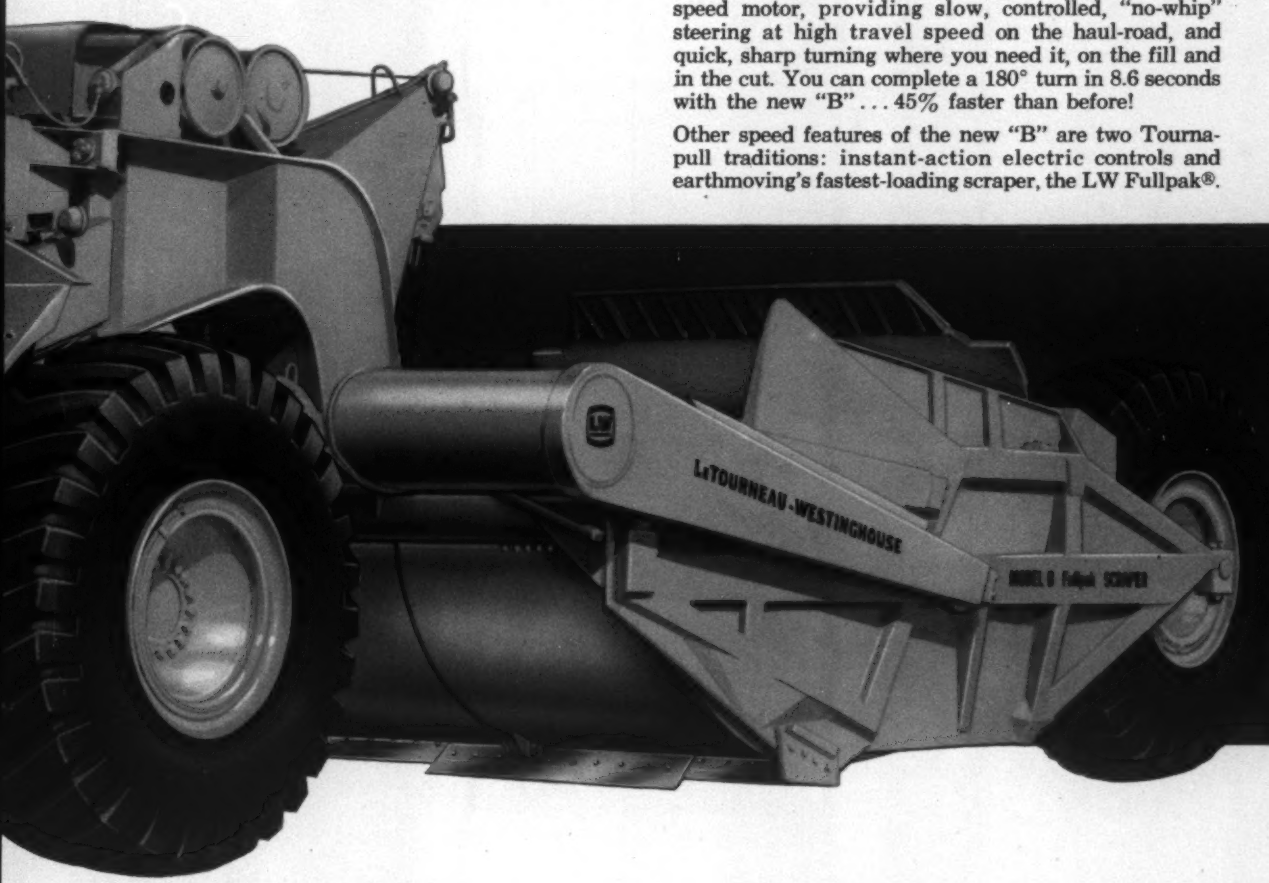
In the *medium*-sized scraper range, the LW V-Power C Tournapull has earned the reputation as the "hottest" powered scraper of all. V-Power "B" is even "hotter!"

Top speed on the new V-Power B 'Pull is now 31.7 mph. That's 3.6 mph faster — almost 13% — than the average of *all* other scrapers in the "B's" size-range. And with a *10-speed* transmission, your operator works faster on every phase of every cycle. In down-shifting, for instance, instead of having to drop down to a speed 4 or 5 miles slower, he need drop down to a speed only 2 or 2.5 miles slower. And he can "skip-shift" in either direction, anytime without double-clutching.

Controlled-steer on the haul; high-speed-steer on the fill

Another new speed feature of the V-Power "B" is a high-inertia steering motor. It has the effect of a two-speed motor, providing slow, controlled, "no-whip" steering at high travel speed on the haul-road, and quick, sharp turning where you need it, on the fill and in the cut. You can complete a 180° turn in 8.6 seconds with the new "B" . . . 45% faster than before!

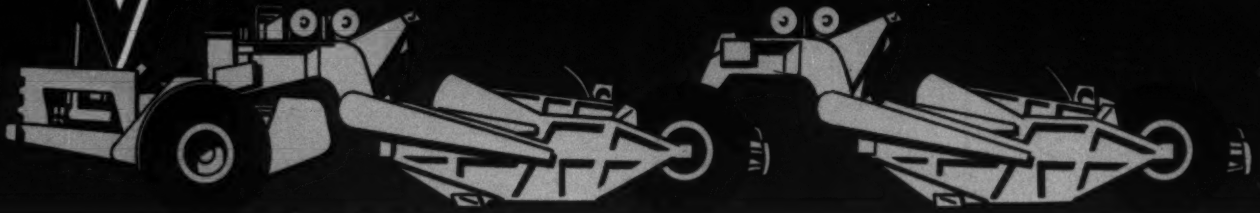
Other speed features of the new "B" are two Tournapull traditions: instant-action electric controls and earthmoving's fastest-loading scraper, the LW Fullpak®.



Struck capacity of the V-Power B 'Pull's low, wide Fullpak scraper is now 23 cubic yards, with a heaped capacity of 29 cubic yards. Redesign of the B Fullpak has *in no way* altered the fast-loading, quick-boil features that have made Fullpak the industry's *most productive* scraper.

Final-drive gears on the V-Power B 'Pull are now *5¼" wide* . . . a full 40% larger than those available until now. The *entire* tooth surface is now heat-treated, and the "straight cut" design assures *maximum* load-bearing strength. No gearing in earthmoving is as simple or as strong! It's built for *rock-bottom* maintenance.

V POWER B 'PULL: more power . . . more production . . . more profit



NEW TANDEM OPERATION

Add a second scraper in minutes ...move TWO LOADS EVERY TRIP!

With its 430-horsepower engine, the new V-Power B Tournapull lets you pull and operate *TWO* Fullpak scrapers with *one* prime-mover. After installation of the simple plug-in jacks, you can add or take off the second scraper *in minutes*. In materials where you usually add side-boards, you can now DOUBLE YOUR CAPACITY for the cost of a second scraper alone.

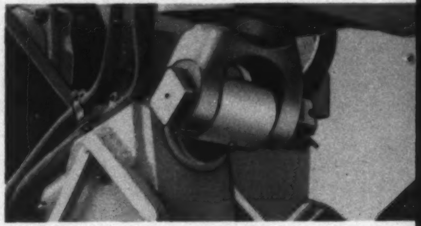
You save on operating costs: you're moving two loads with only one operator and with only little more fuel per shift.

You save on maintenance costs: you still have only one engine, one final drive, one transmission to maintain.

You save on pusher costs: you load both scrapers *faster* than one of the same total capacity (and with the *same* pusher-power you'd use for either scraper!).

You save on haul-road upkeep: pound for pound, there is *less* abuse of haul-roads with tandems than with single scrapers.

Plug-ins connect electricity and air-lines to second scraper. When these are connected, and king-bolt inserted into hitch, second scraper is ready for action!



Rugged universal-swivel hitch is pivoted over rear-axle of front scraper. You can perform any maneuver possible with single scrapers, with no jack-knifing. U-turns take only 20 to 25% more space than single units.

V-Power B 'Pulls are AVAILABLE NOW
At your LeTourneau-Westinghouse Distributor

Every LW Distributor is now ready to:

1. Give you full details on the V-Power "B", biggest profit-builder in earthmoving history.
2. Arrange for you to see one of these powerful units *at work*.
3. Take your order for prompt delivery, to your work-area . . . under terms that are as good as, *or better*, than you can get on any other major piece of earthmoving machinery.

We suggest you see *your* LW Distributor soon . . . to see how quickly you can start adding to your profits with the V-Power "B".

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Where quality is a habit

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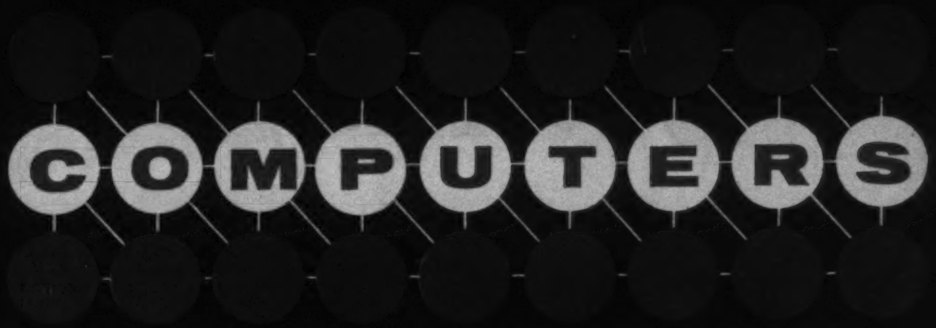


COMPUTERS

What You Should Know About Them

By Frederick S. Merritt

Electronic digital computers are changing U. S. engineering office practices. Designers and construction organizations, turning to these remarkable machines for solution of a wide variety of problems, find they have to modify their methods of collecting and handling data, time schedules, techniques of problem solving and sometimes even their organization.

Those who adapt to the new conditions find that the computers, expensive as they are, pay off. Those who don't are disillusioned.

All are aware that the prime advantage of electronic computers is their high speed of calculating. The major difficulty is how to convert this to dollars-and-cents profit.

On the surface, it looks like high speed automatically enables work to be produced with fewer men. However, with present computers this is not necessarily true. So much preparation time may be required for submission of a task to a machine, if work is not selected or handled judiciously, that more men may be needed than for manual computations. But with careful planning and with personnel trained in computer techniques, it is possible to cut the staff or to handle much more work with the same staff.

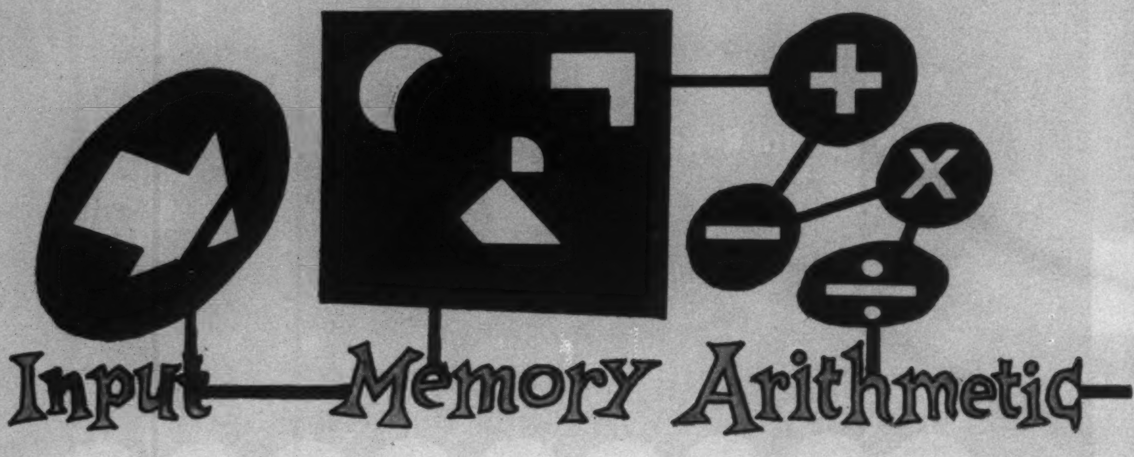
Even when there are no man-hour benefits, high-speed computers can prove profitable because they enable engineers to tackle jobs that otherwise would be prohibitively expensive. For example, in trying to find the least costly way of doing something, engineers without computers usually either pick an answer based on experience or estimate one or two alternates. Electronic computers make possible complex comparative studies of a large number o alternates in a short time.

Furthermore, computations usually can be carried out with greater accuracy than with manual methods. The machines can carry more digits; and they permit engineers to take into account factors hitherto ignored or approximated to simplify calculations.

As more and more designers and constructors gain experience with electronic computers, it becomes increasingly clear that profitable use of these high-speed machines requires restudy of existing practices and considerable advance planning.

In the meantime, computers are being improved continuously and now are entering a new developmental stage. It is time, therefore, to review the role of computers in construction and place the new developments in proper perspective. The following report does this.

***ENR Senior Editor Fred Merritt** could find no electronic editorial device to speed the six months of research, interviewing and writing that went into this special report on the second generation of computers. Mr. Merritt has been following computer development since 1950, when engineering applications began taking on significance.*



Second Generation of Computers:

The second generation of electronic digital computers is here. It hasn't yet outmoded the first generation; but the implication of this news is clear:

It's time for a new look at computers, to see if you can use them to step up your profits.

The introduction of the second generation of computers will not change the fundamentals of computer operation substantially. But the newer machines are better, more suited to users' needs and easier to use.

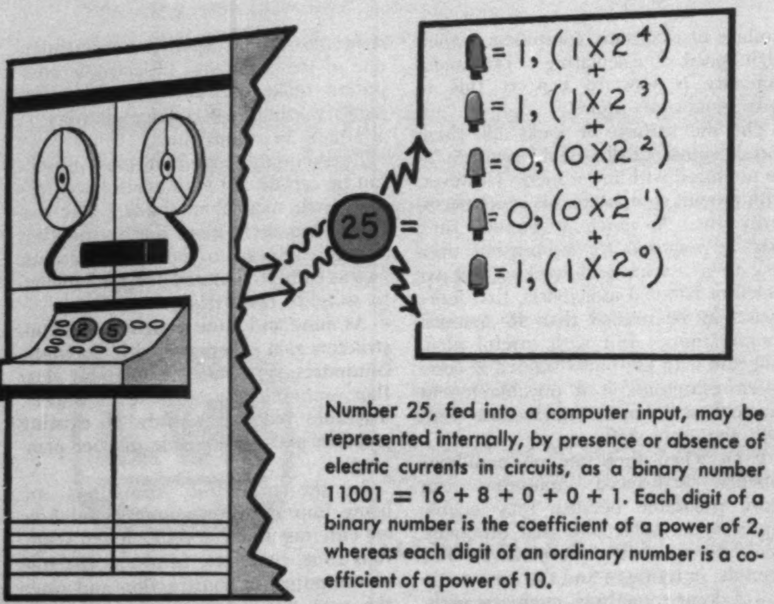
- **The new computers are more rugged.** There should be fewer costly interruptions in the processing of data because of component failure.
- **Transistors are used instead of vacuum tubes in second-generation computers.** This change should reduce the number of component failures, cut overhead costs by lowering the air-conditioning load, slash power consumption and decrease space requirements.
- **Methods of getting information into and out of the machines have been improved.** High-speed calculating was handicapped in earlier models by the relatively slow pace at which data could be fed and results produced in readable form.
- **Programming can be simplified.** The machines can be made to program their own operations to a considerable extent. Furthermore, users don't have to learn a completely strange machine language to instruct it; they can write commands in a code based on ordinary English words and mathematical terms.

Computers of different manufacturers at present require different machine instruction codes. So before a staff can be trained fully in computer operation, a specific machine must be selected. However, the basic principles of construction and operation are about the same for all electronic digital computers.

In essence, a computer is a high-speed adding or subtracting machine. If not designed for subtraction, it subtracts by adding a complement of a number; if not designed for addition, it adds by subtracting complements. It multiplies by repeated addition and shifting of decimal places, divides similarly by repeated subtraction. For more complicated operations, such as extraction of roots, differentiation, integration, and trigonometric, logarithmic and exponential functions, it usually employs a method of converging approximations.

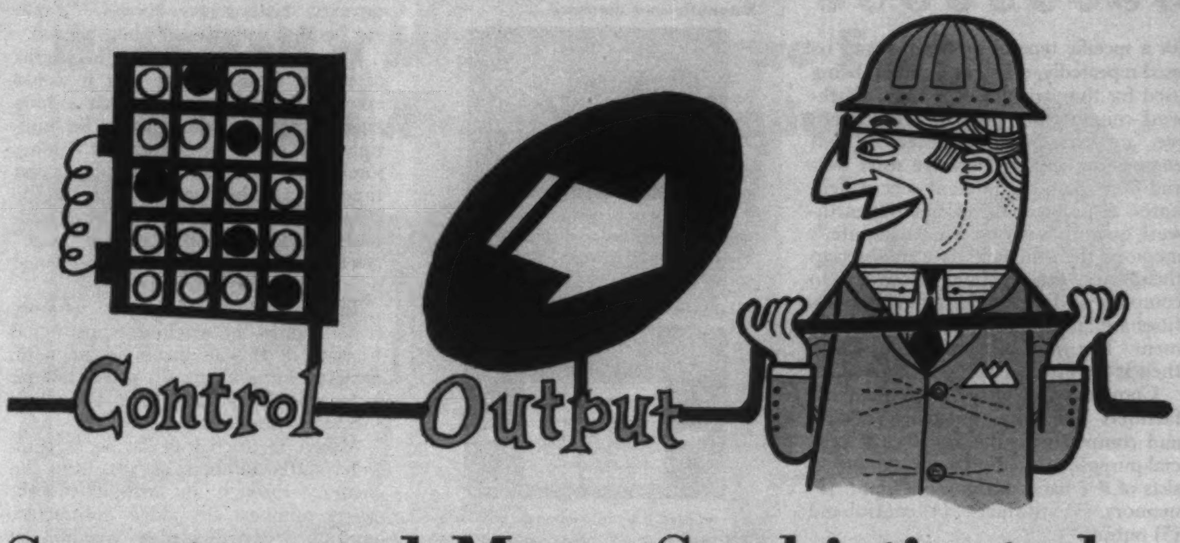
An operation can be completed in a few thousandths or millionths of a second, depending on the design.

Electronic circuitry makes this high speed possible. All operations are based fundamentally on a binary system—either something is present or it is not; either there is or there isn't a hole in a



Number 25, fed into a computer input, may be represented internally, by presence or absence of electric currents in circuits, as a binary number 11001 = 16 + 8 + 0 + 0 + 1. Each digit of a binary number is the coefficient of a power of 2, whereas each digit of an ordinary number is a coefficient of a power of 10.

Computers translate data into a binary code for computing.



Smarter and More Sophisticated

punched card or paper tape, or a magnetic spot on tape or memory drum, or a current flowing through a circuit. Symbolically, these conditions are represented by 1 and 0, respectively.

Each type of computer, in general, has its own code based on 0 and 1 for representing numbers and letters of the alphabet. Plus and minus signs and instructions are similarly coded. But it isn't necessary to write instructions for the machine in this unfamiliar binary language, because ordinary numbers and letters can be translated into binary and back by the computer itself.

A distinguishing characteristic of electronic computers is their ability to carry out long sequences of arithmetic operations automatically. They memorize their instructions as well as the data to be operated on, then carry out the instructions step by step on signal. Furthermore, they can decide between alternatives or modify the instructions.

Computers that memorize their instructions are called stored-program computers. Probably all second-generation general-purpose, digital machines will be this type.

Remarkable as the devices are, they still are only robots. They do only what they are told to do within their capacity. So they must be given detailed, accurate instructions, or programs, for each problem, and development of such programs often takes many man-hours. (Some estimates place the cost at about $5 per instruction for a program with about 1,000 instructions. However, automatic programming may reduce this cost appreciably.)

Once a program has been developed

Short Glossary of Computer Terms

Access time—Interval during which a word is put into or taken from storage.

Address—Set of numbers identifying the cell in the memory where a word is to be stored or found.

Alphanumeric—Representation by numbers and letters.

Arithmetic, fixed point—Operation with a specified number of digits, the position of the decimal point being held constant.

Arithmetic, floating point—Operations permitting varying positions of the decimal point.

Bit—Representation of a binary digit.

Collator—A machine for comparing punched cards and sorting out those with specified information.

Compiling routine—Instructions for translating a program in an arbitrary code (pseudo-code), usually simple language, into computer code or another pseudo-code.

Complement—Number used in addition that effects subtraction of a given number.

Computer, digital—A device that executes sequences of internally stored instruction, calling for arithmetic and logical operations on numbers.

Core, magnetic—Wired device capable of being magnetized and demagnetized, used in the memory for storage of a binary digit.

Drum, magnetic—Rotating cylinder with magnetic coating, used for storage of binary digits.

Flow chart—Graphical representation of a sequence of arithmetic and logical operations.

Head, read-write—Device for recording information in the memory and reporting data stored there.

Interpretive routine—Program for translating an arbitrary code (pseudo-code), usually simple language, into computer code and for execution of operations as translation proceeds.

Jump—Instruction changing the normal sequence of operation.

Loop—Portion of a program that is repeated.

Memory (storage)—Device for receiving, storing and supplying information and instructions.

Microsecond—One-millionth of a second.

Millisecond—One-thousandth of a second.

Plugboard—Removable panel, usually prewired, with electronic circuits for execution of a specific program.

Precision, double—Operation with twice the normal number of digits.

Program—Detailed instructions for a computer to perform desired computations.

Register, arithmetic—Storage device in which are formed sums and other arithmetical and logical results.

Register, index—Storage device for automatically modifying addresses.

Routine—Portion of a program giving instructions for attaining a minor objective.

Word—Group of characters representing instructions and information, handled by a computer as a basic unit.

for a specific type of problem, it can be used repeatedly, different numbers being used for the variables each time. Earthwork-computation programs, for example, are extensively employed in civil engineering offices; they are used over and over again on different sets of field notes. A program for calculating earthwork quantities is stored in a computer's memory; then the field data are fed into the device; the machine is ordered to compute, and finally the required quantities are tabulated by the output equipment. The program, on tape or cards, then is filed for future use on new data.

Computers made by different manufacturers differ in electronic circuitry and components. But usually the general-purpose, stored-program type consists of five basic sections: (1) input, (2) memory, (3) arithmetic, (4) control and (5) output.

Input equipment feeds data and instructions into the memory. The information may be fed directly from an electric typewriter or recorded in advance on punched cards, punched paper tape or magnetic tape. (Magnetic tape is the fastest input device.) Equipment is available that automatically converts decimal digits and letters into binary code for "reading" information into the memory.

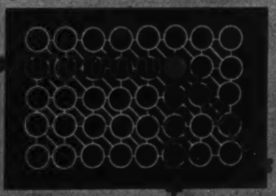
Information for a computer is organized into groups, called words. The word length can be specified for some machines by the programmer; for others, it is fixed by the manufacturer.

The fundamental unit composing a word is a bit–a 1 or a 0. These bits are combined in accordance with a machine's code to form digits. So, in effect, words also are composed of a specific number of digits. These digits, in accordance with another machine code, give instructions to the machine, supply it with a number with a plus or minus sign to be stored or operated on, and tell it where to store or look for a number. But actually a computer works on bits.

Internally, the machine reads the bits from punched cards or tape with metallic brushes or photoelectric cells and from magnetic tape with electromagnetic heads. Whenever a hole or magnetic spot appears under the reading device, a pulse of electric current flows into the memory. So the presence or absence of current signifies a bit.

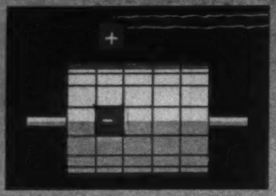
The portion of a word to be stored is sent, as bits, to a specific location in the memory. Each location has a number, or address, assigned to it for identification. The computer can be told to put a set of digits in a certain address or to take one out from there. The time it takes a computer to obey this command is called access time.

Magnetic-core memory . . .



. . . registers a bit at the intersection of two electric currents, which magnetize a core. Presence of a bit is "read" by a diagonal current.

Magnetic-drum memory . . .



. . . registers a bit as a magnetic spot as a specified "address" on a drum rotating at high speed passes under a "read-write" head.

EITHER CORES OR DRUMS are used for storage. Cores offer faster access.

The fastest commercial memory device now in use is the magnetic core matrix, which has an access time of a few millionths of a second. It consists of ferro-magnetic toroids (doughnut shapes) about 0.08 in. in diameter strung on criss-crossing and diagonal wires. A current through a pair of criss-crossing wires magnetizes the core at their intersection; thus, a magnetized or unmagnetized core represents a bit. The diagonal wires are used to "read" the cores.

Other fast-access commercial memory devices include sonic delay lines, which continuously circulate data by converting electrical pulses to sound waves in a mercury tube and the waves back to electrical pulses.

The widely used magnetic drum is a medium-access storage unit. It has an access time of a few thousandths of a second. A nonmagnetic metal cylinder coated with a magnetic material, the drum records bits as the presence or absence of magnetic spots in parallel bands on its surface. It rotates at high-speed while electromagnetic "read-write heads" around the periphery of each band add, remove or record the presence of magnetic spots. Sometimes rotating disks are used for storage.

Drum and disk memories are slower than magnetic cores because of the time lost waiting for an address to appear under a reading head.

Magnetic tape also may be used for storage, but it is relatively slow for this purpose. However, it can store large amounts of information compactly at relatively low cost. It is particularly useful as an auxiliary memory with lower-capacity, faster-access devices. Tapes can be filed and re-used when needed.

Magnetic tape may be used in lengths of several thousand feet. But it would take several minutes to search a long tape for desired information. So multiple tape units only about 200 ft long, sometimes are used to reduce access time. Or a wide magnetic tape may be draped over a drum with rotating read-write heads inside that read a "page" (section of the tape that can be scanned without moving) at a time.

Information stored in the memory remains until the machine is instructed to erase it. It will remain in magnetic devices even if there is a power failure; but sonic delay lines may lose their memory without power.

When instructed to do so, a computer shifts numbers, as bits, from the memory through an arithmetic unit, where numbers are added, subtracted, multiplied and divided as required by the program. Since this is done by electronic circuits, several hundred operations can be performed in a second. By comparing (subtracting) numbers, the arithmetic unit also can make "yes" or "no" decisions. On instruction, the computer shifts results to the output or to assigned addresses in the memory.

Operations are governed by the electronic circuits of the control unit. Coded instructions are interpreted by this unit, which then actuates other parts of the computer to implement the instructions. Stored-program computers automatically send instructions to the control unit in proper sequence until the program has been completed.

Finally, the machine writes out the answers. For fast output, results may be recorded first on magnetic tape. Or punched cards or punched tape may be used. Sometimes, the results are fed directly to an electric typewriter,

When greater speed is needed, a line printer may be used. It can print a line of 130 characters at a time and attain speeds as high as 25 lines per second.

The five basic computer components may also be supplemented by auxiliary equipment, such as additional memory devices, verifiers (to check the accuracy of punched cards or tapes) and converters (for transferring data from cards to tape and vice versa).

In short, then, the latest computers are designed for fast and easy input of data and instructions. The instructions may be in a code based on ordinary English and mathematical terms. The machine stores information in medium or fast-access memories, sometimes supplemented by large-capacity slower-access memories. Their control unit causes operations to proceed automatically in the sequence dictated by a stored program. And the results are typed or printed out at high speed.

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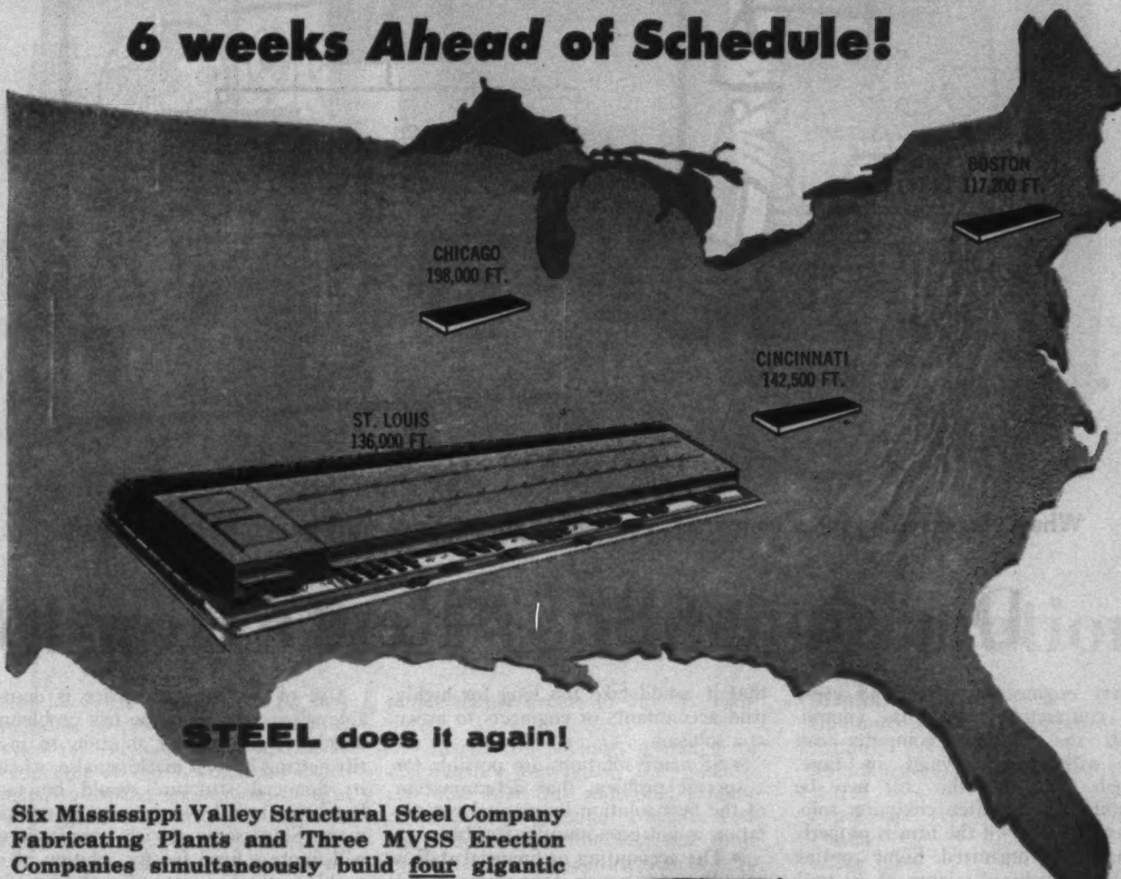
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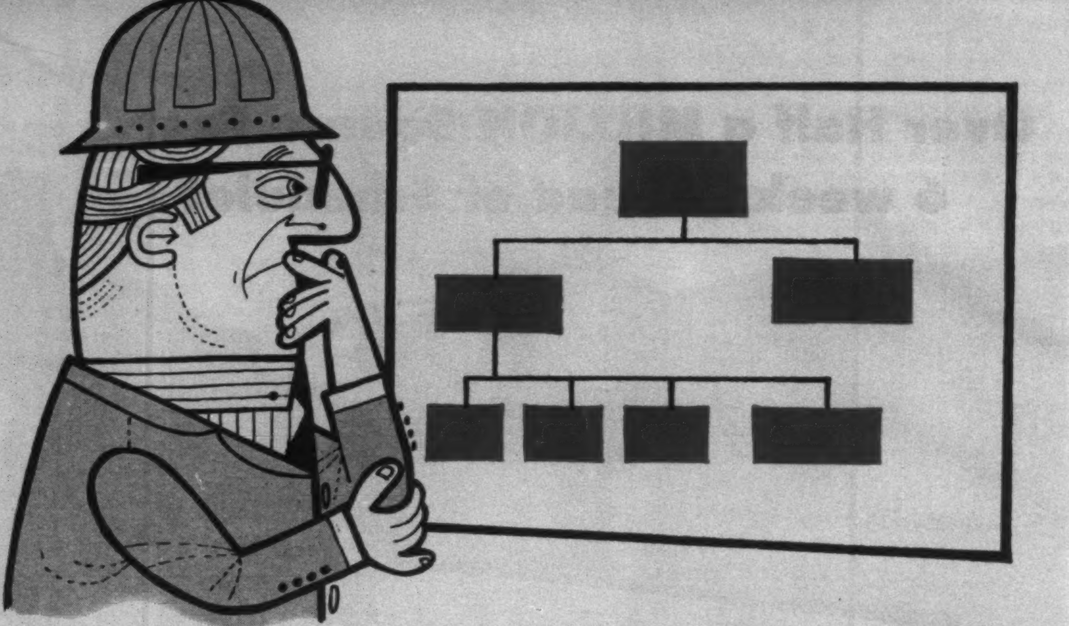


When you buy or rent a computer, you can organize your staff in one of several ways . . .

Decisions: Buy? Rent? How to

Every engineering office and every large contracting office has computations an electronic computer can solve with great savings in time. Though sometimes the cost may be prohibitive, more often computer solutions will pay off—if the firm is properly prepared and organized. Some routine jobs have produced savings of 30 to 1 in both time and money.

When is it profitable to use an electronic computer? This is a question that is impossible to answer at present with strictly a dollars-and-cents cost comparison. Too many intangibles are involved. Each firm must consider its own financial structure, the composition and capabilities of its staff, type and amount of work expected to be handled and importance of time saving.

Not to be overlooked is the possible edge a computer may give a firm over competitors not similarly equipped. Clients may consider the firm with a computer "progressive" and also may be impressed by the argument that designs and construction methods worked out by computers are better and more economical.

So while a firm should make studies comparing the costs of manual and computer solutions of its problems, the final decision must take into account many other factors.

In general terms, use of a computer is worth investigating when:

- Accounting, mathematical, design or construction problems are so complex or such great accuracy is required that it would take too long for highly paid accountants or engineers to arrive at a solution.
- So many solutions are possible for a specific problem that determination of the best solution by manual computation is not economically feasible.
- The accounting or financial staff is spending too much time turning out repetitive reports.
- Engineers are spending too much time on routine calculations.
- The engineering staff is not large enough to take on added work and expansion is not desirable.
- Large amounts of data are available but are useless because they are not correlated or tabulated.

After a firm is convinced that use of a computer is worthwhile, the next decision to be made is whether to turn its problems over to a computer service organization or to get a computer of its own.

A typical computer service organization rents out time on a high-speed computer and employs specialists to program and code problems. Some organizations have specialists with civil engineering background, who also assist their clients in formulating problems and analyzing them for computer solution. Many of the service organizations maintain or have access to program libraries, making programming less costly.

Sometimes, to share the cost of a computer, several engineering firms set up their own computer center or service organization.

Use of a computer service is desirable when a firm has too few problems suitable for computer solution to justify getting its own machine; also, when its financial structure would be too highly strained by investment in equipment. Since some service organizations will quote a fixed fee for solution of a problem, their services offer the benefit of known cost. Furthermore, cost of computer service, as well as rental cost, is fully deductible from income tax.

As a rule of thumb, if an office has more than 20 engineers, it probably can support a computer of its own. However, the convenience and flexibility of an on-site computer should be compared with job costs obtainable by using the larger equipment and other facilities of a computer service organization.

For some types of problems, particularly those where close contact of engineer and problem solution is desirable, use of a service organization may not be advantageous. The speed of communication between the firm and a service organization also must be taken into account. There may be times when an answer is required immediately and cannot be obtained when needed from a service group.

In any event, the convenience of having a computer on the premises should not be overlooked. Time on it can be scheduled to meet office needs; the staff has the opportunity to become familiar with its operation; and the chances are that, as a result of this familiarity,

OPEN =
CLOSED =
SEMI-OPEN =

. . . Let everyone run the computer . . . hire or develop specialists . . . or do both.

Organize for Profitable Operation

many ideas will be generated for more profitable operation of the computer. When the machine is not needed for production, it can be used for experiments, to expand applications of existing programs and aid in development of new ones.

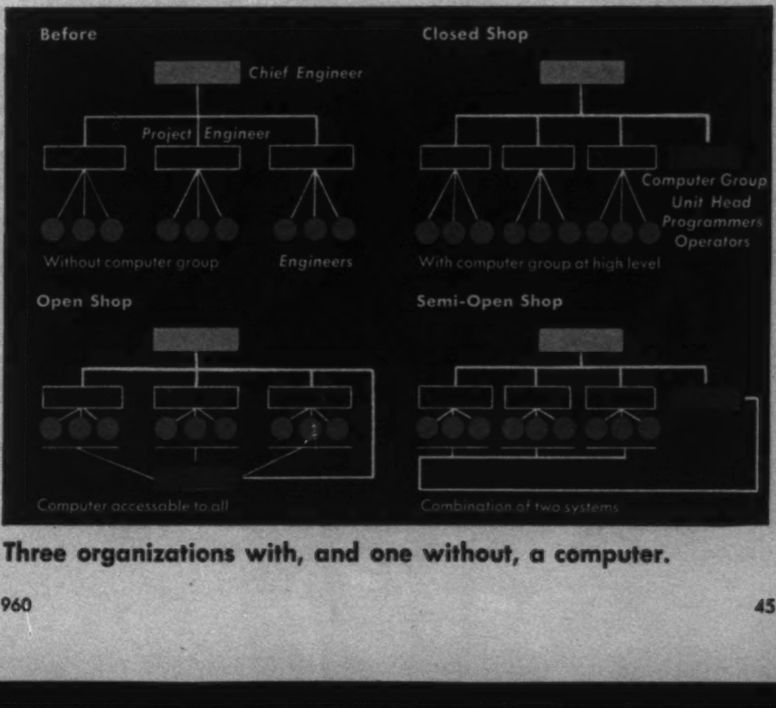
If a firm decides to gets its own machine, another choice confronts it—buy or rent? For most engineering firms, this is not a difficult decision in view of the large investment purchase entails. However, if adequate working capital is available, buying a computer may be more economical than renting. In reaching this decision, though, here are some other factors than capital structure that should be taken into account:

- Cost of renting is fully deductible from income tax. Purchase price, in contrast, has to be amortized over a period of time—so only a part of the computer cost can be deducted each year.
- A purchaser bears the cost of obsolescence. Since great advances have been made in computer design in recent years, it is reasonable to assume that progress will continue to be nearly as rapid in the next few years. Hence, a firm that buys a machine may soon find it owns an outmoded device that can be replaced only at considerable expense.
- It may be possible to rent first, buy later. Some computer manufacturers will apply a substantial percentage of the rental during the first or second years toward the purchase price if the renter should decide to buy the computer.
- Rental cost includes a charge for maintenance and repair. But purchasers must bear this additional expense either directly or under a service contract. The cost, in either case, may come to one-fourth to one-third that of renting for electronic-tube machines and about one-tenth the rental cost for transistorized computers.

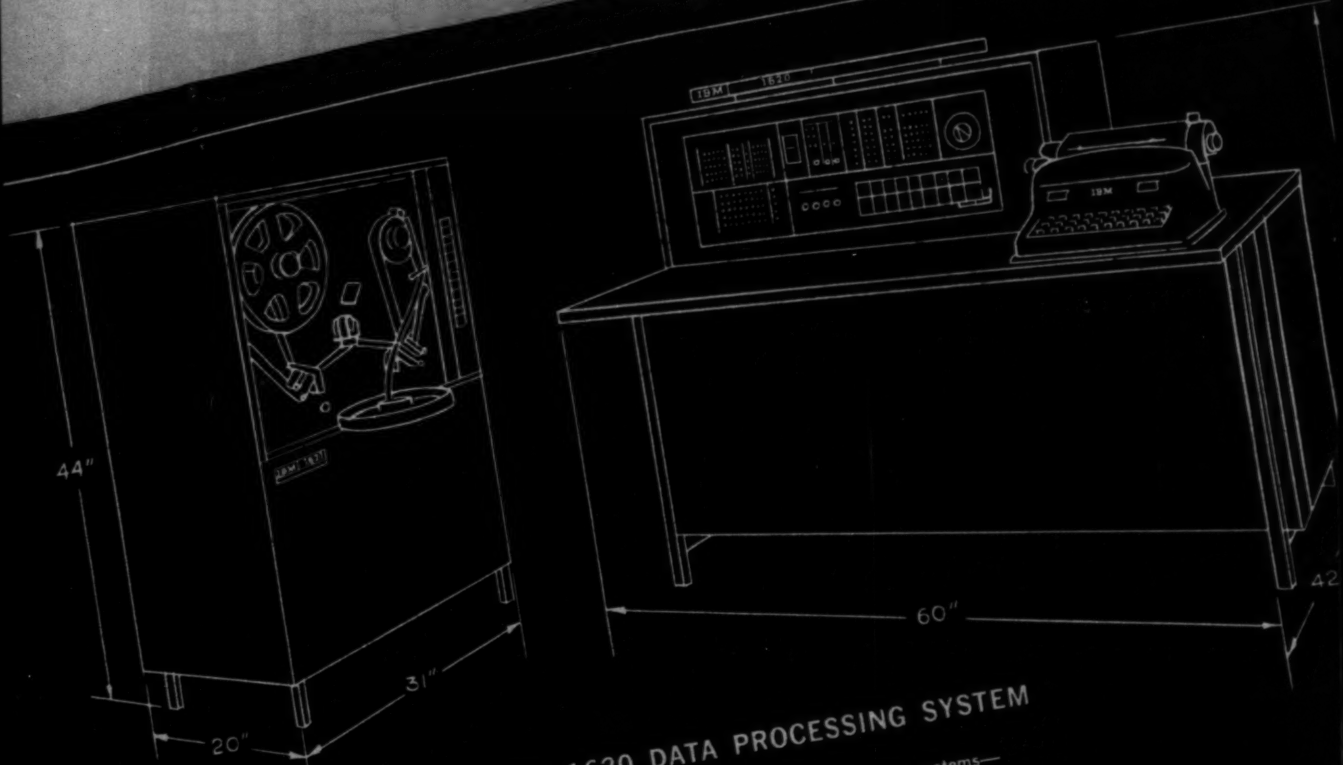
One firm that purchased a computer found that its monthly costs broke down this way:

Monthly Cost	%
Computer (60-month amortization)	65
Maintenance (service only)	13
Parts	3
Paper, tape, typewriter ribbons	2
Power	2
Office space	2
Taxes, insurance	13
Total	100

These figures seem to indicate that the monthly cost of ownership may be expected to be about 50% greater than


Before
Chief Engineer
Project Engineer
Without computer group
Engineers
Closed Shop
Computer Group
Unit Head
Programmers
Operators
With computer group at high level
Open Shop
Computer accessable to all
Semi-Open Shop
Combination of two systems

Three organizations with, and one without, a computer.



SPECIFICATIONS: IBM 1620 DATA PROCESSING SYSTEM

- Core storage—20,000 digits
- Automatic operation—stored programming
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- Powerful instructions with two data addresses
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- Advanced programming systems—Fortran and symbolic programming
- Compatibility with other computers through Fortran
- Simple console with logging features
- Self checking throughout
- Transistorized circuitry—compact, economical, reliable
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The 1620 will meet technical computing requirements too complex for the conventional desk-type calculator. It provides many advantages of larger systems at a much lower cost. In addition, it can be used to support other data processing systems such as the IBM 650, 704, 705, 709, 7070 and 7090.

Information enters the system from the typewriter of the 1620 Central Processing Unit, or from the 1621 Paper Tape Reader. Output is to the typewriter or 961 Tape Punch.

Machine	Weight in lbs.	Current Requirements	Power cord	Interconnecting cable	Heat Load Specification BTU/Hr
1620	1,000	20 Amps., 115 Volts, single phase 10 Amps., 230 Volts, single phase 6.5 Amps., 208 Volts, three phase	10' 3-Wire for 115 and 230 Volts 10' 4-Wire for 208 Volts	10' signal 10' power	5,000
1621	280	—	—	—	2,000

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The 1620 is easy to learn, easy to operate, easy to communicate with. It adapts readily to specialized and general problems such as design development, blending problems involving matrix arithmetic, research calculations with differential equations. It facilitates the development of mathematical models for plant and shop operation, and evaluation studies employing statistical techniques such as regression analysis.

IBM also makes available a comprehensive library of mathematical routines and programs as well as reliable customer engineering. These services supporting the 1620 are an important part of IBM Balanced Data Processing. They make it easy for you to make full use of the 1620 in your operations without delay. Like all IBM data processing equipment, the 1620 may be purchased or leased.

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CITY ______________ ZONE ______ STATE ______

the purchase price of the computer amortized over 60 months. The total cost over a period of time may be less than the total rental cost. The longer the amortization period the more profitable purchasing appears.

The next decision that has to be made is an extremely important one: Which computer to use? This decision must be made early because of the necessity of time-consuming preparation of the staff for a specific machine and the possible delay between order and delivery of equipment. And until there is much more industry-wide standardization of programming and coding, the decision should be final, or considerable expense will be incurred in retraining. (For hints on how to choose a machine, see p. 61.)

After a specific computer has been selected, thought can be given to organizing and preparing the staff for it. Staff organization can be one of two types or a compromise between them:

- **Closed shop**—A group of computer specialists is set up in the firm. They do the programming and coding and operate the machine. (See "Tips on Organizing Computer Operation," ENR Mar. 27, 1958, p. 43.) More efficient utilization of the computer is possible with this system.
- **Open shop**—There is no specialized group, except possibly machine operators. Programming and coding are done by those who initiate the analysis.

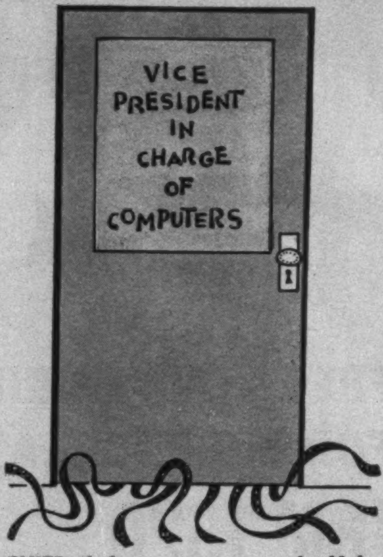
One form of compromise is the semi-open shop. General programming and special assignments are handled by a computer group, but open-shop programming and coding are also encouraged.

The type of organization a firm should use depends on the capabilities of its staff and the type of computer selected. The simpler programming, coding and operation of a computer are, the greater the potentials of an open shop.

At least one member of the staff should go to a computer school even before all the basic decisions have been made. His knowledge and experience can help in making these decisions.

Before the computer is installed, more of the staff should go to computer school. Elwyn H. King, of Alfred Benesch & Co., Chicago consulting engineers, recommends that firms with up to 100 employees should send at least four men to school. Larger organizations may find it desirable to send at least two from each major department and one from each minor department.

The trained men can later train others of the staff. With an open shop, the whole staff should be trained eventually.



CHIEF of the computer group should be one of the firm's top men.

Also in preparation for the computer, a study should be made of available programs to determine which can be used in the firm's work. (Programs can be borrowed from libraries maintained by user groups and government agencies, such as the Bureau of Public Roads.) Those programs selected should be checked closely to verify their accuracy and suitability to the firm's needs, and time should be purchased on someone else's machine to try them out and to gain experience.

As soon as possible, the trained men should start developing programs that will be needed but are not available from other sources. Mr. King suggests that short programs be attempted at first, until the men gain facility in programming. In that way, the firm will have more programs available and it will be able to get greater production from the computer immediately.

"It cannot be stated too often," Mr. King says, "that the maximum benefit is obtained from a computer only with a large-scale developmental effort."

Another good idea is to start with problems at the beginning and end of processes. If this is done, it will not be necessary to interrupt work to await computer solutions.

The man in charge of the computer should be one of the top men in the firm. The men sent to computer school from each department should include one of senior grade with aptitude for mathematical problem solution. Others may be juniors with analytical ability, who will do the actual coding and eventually become the computer experts.

When a closed-shop organization is used, it may be desirable to assign the man in charge of the computer or the senior of a department the task of analyzing problems and sketching the flow chart. The juniors should assist with the programming and do the coding, staying with the problem through the "debugging"; they make the precise manual calculations in checking.

Some firms train technicians to operate their computers. Others encourage all computer-trained men to use the machine, in the belief that it is advantageous for the men to understand its operation. An operator must have the ability to type accurately, follow orders precisely and know the operations of the machine in detail. In some cases, coding skill may be required, so that the operator can be kept busy when the machine is not in use.

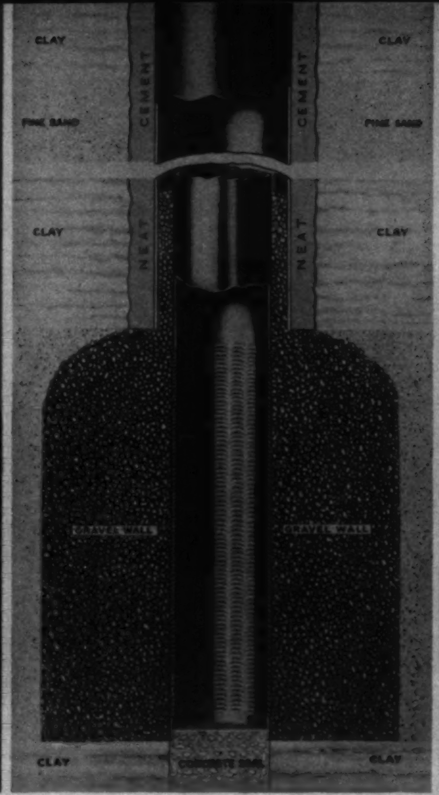
It is advantageous with a closed-shop organization to hold seminars to familiarize the whole staff with computer techniques. The men must be taught to submit data on input forms provided for the purpose and to abide by schedules set up for efficient computer operation. As a rule, they should not be permitted to wait at the computer while their problems are being worked on.

If computer operation is to be profitable, work should be scheduled so that problems of the same type are tackled in succession. Tasks the computer group has under way should not be interrupted, except for items of high priority. With a busy, efficiently scheduled computer, there may be a delay of four to twenty-four hours between submission and solution of a problem. Hence, all work must be carefully planned to avoid loss of time.

To reduce the posibility of mistakes and omissions in data supplied a computer, input should be clearly written or typed on carefully prepared forms. Standard forms for output also are desirable. Each item on them should be clearly labelled.

Input data should be checked as a matter of routine before going to the computer staff. (Senior men should look for mistakes in both input and output, since, in general, the machine cannot distinguish between correct and incorrect basic data.) Where possible, input and output should be on the same sheet to prevent them from becoming separated and mixed with other problems. If they have to be on separate sheets, include in the input an identification item in code that will appear unchanged in the output.

As the firm gains experience, it will tackle more and more complex assignments. Soon it will learn that solutions by methods convenient for manual computation are not necessarily the best for electronic computers, and it will look for more efficient techniques. Previously neglected mathematics, such as matrix analysis, suddenly will become important. Ignored factors in problem solution no longer need be overlooked.



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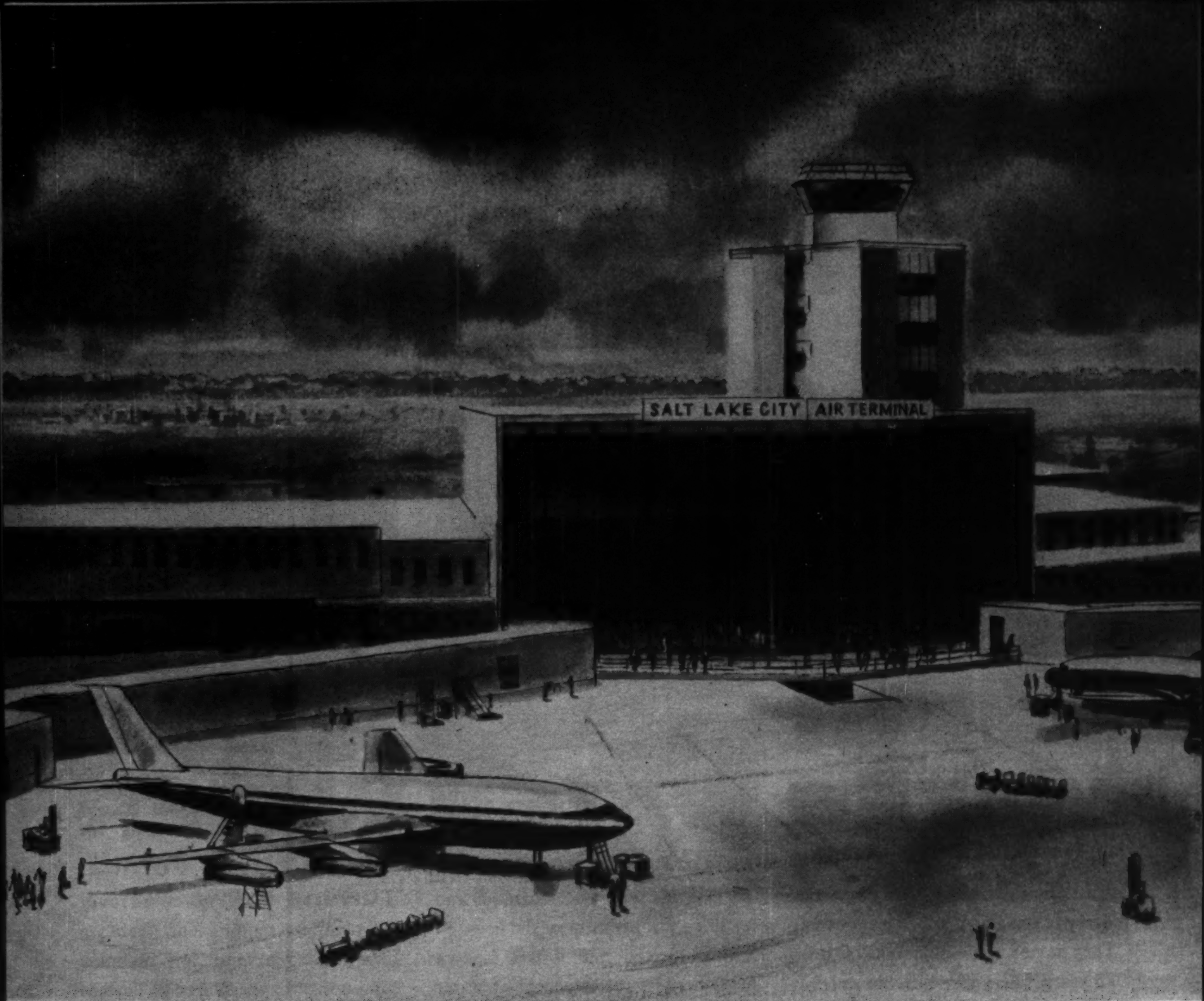
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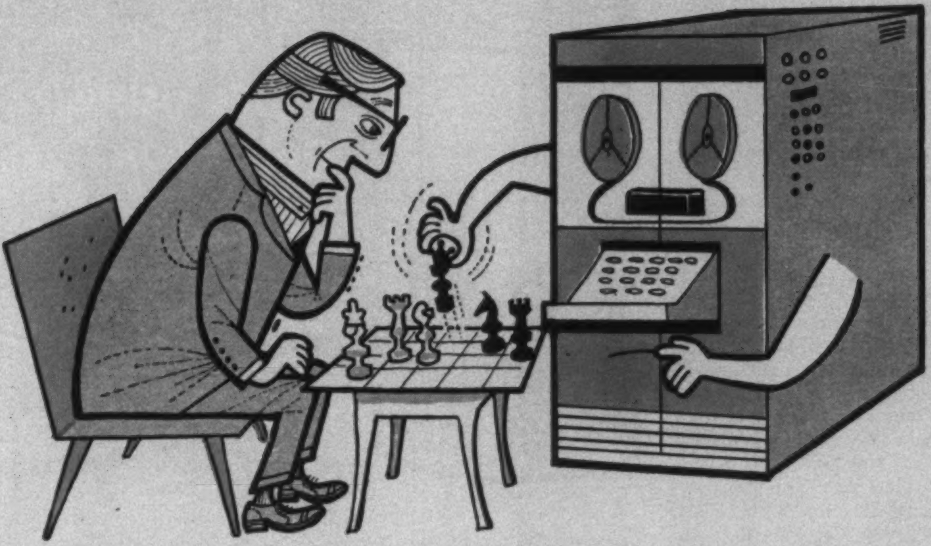


Familiarity with the machine's language and logic is essential in learning . . .

How to Program a Digital Computer

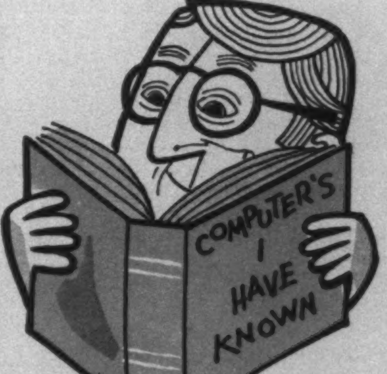
Uses to which computers are being put in construction are rapidly becoming legion. Here is a small sampling:

- At least 40 state highway departments now use electronic digital computers for a wide variety of engineering problems, including earthwork computations, horizontal and vertical alignment of highways, traffic studies and bridge geometry and design.
- Some contractors use computers for accounting and payroll purposes and for improved scheduling of men and equipment.
- Numerous engineering offices use the machines for land-subdivision calculations, structural design, operation and design of water storage and distribution systems and sewer network computations.

They report tremendous time savings. An electronic digital computer, one of several available low and medium-priced machines, for example will figure one mile of highway cut and fill (100 stations per mile, with 25 readings per station) in 15 minutes; it will compute and balance survey traverses at the rate of 2,500 to 3,000 courses per hour; determine the axial forces in simple trusses at the rate of one second per joint; distribute bending moments in continuous beams at the rate of three seconds per joint; design a composite (steel-concrete) beam in about 35 seconds; compute deflections, moments and shears in the stiffening trusses and tension in the cables of a three-span suspension bridge in 15 minutes or even less.

For every type of problem to be solved, a set of computer instructions, or program, must be available. Since most computers take instructions in different codes, or languages, programs generally must be written for a specific machine.

And frequently, many man-hours of work are required for their development, so that the economy of a computer application may hinge on the cost of programming it.



Users must know computers well.

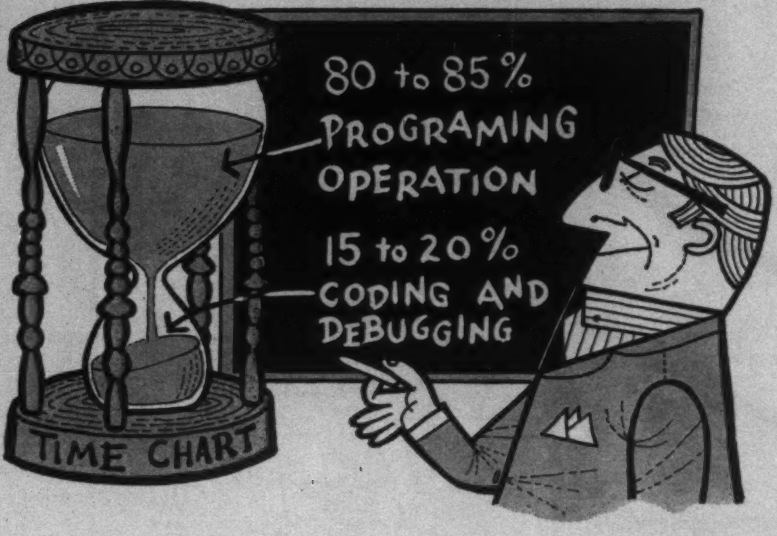
However, many engineering organizations have contributed programs to group libraries for the use of members. Outstanding examples are the libraries formed by users of the same makes of computers. By joining one of such groups you may be able to reduce your programming costs. Also, the Bureau of Public Roads maintains a library of programs donated by various organizations and rewritten to remove terminology peculiar to the computers for which they were originally developed. You may be able to adapt these programs to your problems less expensively than developing your own program.

If a computer program is not available, one will have to be prepared. Most organizations using a computer have at least one trained programmer on the staff.

It is better to train an engineer to program than to employ an experienced programmer who is not an engineer. For usually the programming of an engineering problem requires exercise of engineering judgment.

The task of translating a program into machine codes, however, can be performed satisfactorily by an experienced coder who is not an engineer.

A programmer must know intimately the computer he uses. He must be a capable problem and systems analyst and a skillful interpreter. He must be able to visualize a problem as a whole, then reduce it to its components. He



At first, most computation time will be spent on programming.

must be familiar with the logical working of the computer, its operating capabilities and the use of all equipment involved in the solution of a problem. He must be able to choose the fastest and most accurate methods of solution by computer. And he must be able to translate the logical steps of problem solution into computer language.

As an aid in visualizing the steps, programmers may draw a process chart. This shows the flow of data through the computer—input, various processing stages and output. The chart might indicate, for example, the punching of field data on cards, conversion of the card data to paper tape, general operations to be performed on the computer, results on paper tape and finally results from a high-speed printer (p. 54).

The next step is to draw a flow chart, which shows step by step what the computer is to do. Each operation of the computer is indicated by a symbol (boxes, circles, ovals) and the sequence of operations by arrows.

Operations may be classified in three main categories:

1. Transfer—movement of data into and out of the computer and circulation of data inside the unit.
2. Arithmetic—addition, multiplication, etc.
3. Decision—comparison of numbers and an action depending on their relative magnitude.

A possible flow chart for a beam-design problem is shown on page 54. The sizes (weights in lb per lin ft) of about 1,000 floorbeams in a building are to be checked, given for each the total uniform load in kips, span in feet and allowable unit stress of 20 kips per sq in. Architectural and other requirements limit all beams to a nominal 16x7-in. wide-flange section. (Four sizes are available, with weight and section modulus, respectively: 36, 56.3; 40, 64.4; 45, 72.4; and 50, 80.7.)

Analysis resolves the problem into the solution of the simple equation: $S = 0.075\,WL$, where S is the required section modulus, W the total uniform load in kips and L the span in feet. (The problem was chosen merely as a simple example of programming and not as an example of the kind of problem for which a computer is needed.) The flow chart illustrates the reasoning and instructions that would have to be followed in solving this problem. Here are the steps:

1. Take a value of W and L (from the memory).
2. Compute the required section modulus ($S = 0.075WL$).
3. Compare the result of Step 2 with the section modulus of the 36-lb beam. If S is equal to or less than 56.3, write 36 under a heading, "Required Beam Size—Lb per Lin Ft," and return to Step 1 for data for the next beam. If S is greater than 56.3, go to Step 4.
4. Compare the result of Step 2 with the section modulus of the 40-lb beam. If S is equal to or less than 64.4, write 40 under beam size and return to Step 1. If S is greater than 64.4, go to Step 5.
5. Compare the result of Step 2 with the section modulus of the 45-lb beam. If S is equal to or less than 72.4, write 45 and return to Step 1. If S is greater than 72.4, go to Step 6.
6. Compare the result of Step 2 with the section modulus of the 50-lb beam. If S is equal to or less than 80.7, write 50 and return to Step 1. If S is greater than 80.7, halt; there must be a mistake some place. (Though not shown in this example, some provision also must be made for stopping the computer after the last beam has been checked.)

Usually, the flow chart for a computer problem is long and complex. To facilitate analysis, the programmer may lay out the chart in sections, noting the relationship between the various components.

Now the coding job begins; the flow chart must be translated into machine language. The programmer cannot simply ask the machine, "Is S equal to or less than 56.3?" He must code instructions that, in effect, say, "Bring 56.3 from the storage unit, or memory, to the arithmetic unit. Bring the result of Step 2 from the memory and subtract it from 56.3. If the difference is zero or positive, transfer 36 from one part of the memory to a part reserved for output—later punching out on tape or cards. . . ." Any number of such instructions may be needed for a single flow chart step.

(Note: Transferring a number from an address in the memory to another part of the computer does not necessarily erase it. Hence, it can be reused.)

A computer instruction may be represented by a combination of numbers or letters and numbers. In the simplest form, a coded instruction might consist of two parts—an operation code and a data address.

The operation code might be a two-digit number telling the machine what to do: 20—Read (RD); 21—Write (WR); 22—Add; 23—Subtract (SUB); 24—Multiply (MUL); 25—Store (ST).

The data address might be a four or five-digit number giving the coordinates of a location in the memory; the computer will perform the indicated operation on the number at that location. (If desired, the computer can also operate on an address.)

This type of code is called single address. Usually, the computer instructed with such a code will automatically go from step to step in sequence.

For most computers, codes with more than one address are used. These computers require fewer instructions for the solution of a problem than those with single-address codes—hence, programming is simpler. And when there is more than one address, the additional ones can be used for different purposes. For example, in a two-address code, both addresses may be instructions or data, or one address may be an instruction and the second may tell the computer where the next instruction is located in the memory.

A coder working with the simple beam-design problem previously flow charted might go about writing the solution in a two-address code somewhat in this manner: Assign memory

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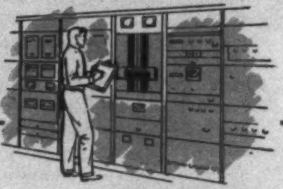
Outstanding features of the PB 250 include: ●MICROSECOND SPEED: Addition and subtraction require 12 microseconds. Multiplication takes 276 microseconds and division 252 microseconds. ●EXPANDABLE MEMORY: Minimum capacity of 1,808 words, expandable to 15,888 words. External core memory of 16,384 words available. ●COMMAND STRUCTURE: Versatile command list of 46 instructions. ●SIMPLE PROGRAMMING: Internally programmed, single address instructions, command indexing, and automatic double precision operations. ●INPUT-OUTPUT SYSTEMS: Automatic typewriter, paper tape reader, and punch standard. Complete range of peripheral equipment available. ●EXCEPTIONAL RELIABILITY: Conservative solid-state design, small component count, and absence of moving parts. ●SYSTEMS INTEGRATION: May be integrated into existing systems, on- or off-line. Ability to operate as universal format-to-format converter.



The design of the PB 250 enables it to be mounted as a systems component in 31½ in. of a standard relay rack.

SPECIFICATIONS

TYPE
Serial, binary, internal program.

COMMAND STRUCTURE
Single address with index register.
46 commands.

OPERATION TIMES (22 bit word)

Add/subtract	12 μsec.
Multiply	276 μsec. (max.)
Divide	252 μsec. (max.)
Square root	252 μsec. (max.)

MEMORY
Type: Magnetostrictive delay lines.
Capacity: 1,808 words standard, expandable to 15,888 words.

INPUT-OUTPUT
Standard: Automatic typewriter, paper tape punch and reader, 30 control inputs, 32 control outputs, high-speed block input-output (85 KC word rate).
Optional: High-speed paper tape punch and reader, magnetic tape units (six maximum) employing IBM 700 series format, punched card equipment.

DIMENSIONS
30 in. high, 19 in. wide, 24 in. deep.

POWER REQUIREMENT
115 volts, 60 cycles, at 100 watts.

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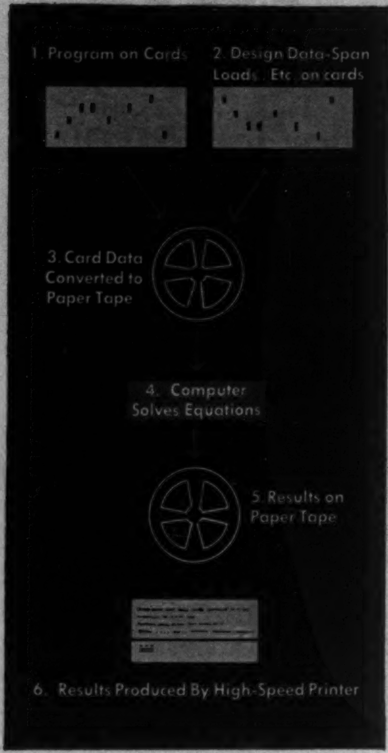

1. Program on Cards
2. Design Data-Span Loads, Etc. on cards
3. Card Data Converted to Paper Tape
4. Computer Solves Equations
5. Results on Paper Tape
6. Results Produced By High-Speed Printer

Steps in computer solution.

addresses 00001 to 02000 to values of W and L. Then, allot 02001 to 02004 to the four beam weights, 36, 40, 45 and 50, respectively; 02005 to 02008 to the four section moduli, 56.3, 64.4, 72.4, and 80.7, respectively; and 02009 to the coefficient 0.075. Store instructions in a block of addresses beginning with 03001. Use a block starting with 05001 for temporary storage. Finally, assign computed beam sizes (weights) in a block of addresses beginning with 07001.

The coder might write instructions for the solution of the problem beginning in the following manner:

03001 CA 26 02009 03002

This means that the first instruction to the computer—260200903002—is to clear the arithmetic unit (CA), put 0.075, which is in location 02009, in it, then go to location 03002 for the next instruction.

03002 MUL 24 00001 03003

The second instruction—240000103003—tells the computer to multiply the number in the arithmetic unit by the value of W in location 00001 and leave the product in the arithmetic unit. Go to 03003 for the next instruction.

03003 MUL 24 00002 03004

Multiply the number in the arithmetic unit by the value of L in location 00002 and leave the product in the arithmetic unit. Go to 03004.

03004 ST 25 05001 03005

Store the number now in the arithmetic unit (0.075*WL*) in location 05001. Get the next instruction from location 03005.

03005 CA 26 02005 03006

Clear the arithmetic unit and put 56.3, which is in location 02005, in it. Then go to 03006.

03006 SUB 23 05001 03007

Subtract from the number in the arithmetic unit the value of 0.075*WL*, in location 05001. Go to 03007.

03007 BMI 27 03008 04001

Here, BMI signifies "Branch, on minus." If the number in the arithmetic unit has a negative sign, the next instruction performed will be that in location 03008. Otherwise, the usual instruction address—in this case, 04001—will be used.

Hence, if 0.075*WL* is equal to or less than 56.3, the next instructions would be to clear the arithmetic unit, put 36 in it, transfer 36 to 07001 for punching out later, and then continue the cycle with new values of W and L.

If 0.075*WL* is greater than 56.3, so that the arithmetic unit contains a negative number, the next instructions to the computer would be to compare 0.075*WL* with 64.4. This branch would be continued in accordance with the flow chart until the computer is instructed to get new values of W and L.

It is not necessary to have new instructions each time the computer is to pick up new values of the variables. Many computers can do this automatically by modifying an initial set of addresses for the variables. It adds a number to these addresses at the beginning of each cycle, to obtain the locations of the next set of values.

One important phase of programming not yet mentioned is the handling of decimals. Two techniques are in use.

- One is called fixed-point arithmetic. It requires the programmer to "scale" his numbers for greatest accuracy. He must decide where the decimal point will remain throughout a computation. He must instruct the machine to shift to right or left a specific number of places for addition, subtraction and division to align decimal points and also tell it which digits to retain in multiplication.
- The other technique is called floating-point arithmetic. Some computers can handle it automatically.

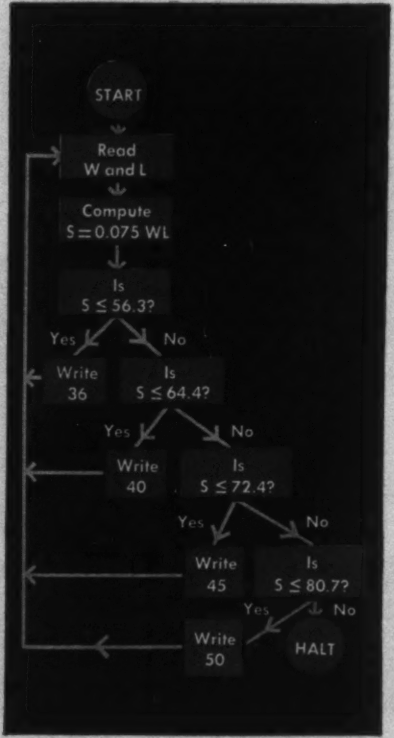
Exponential notation is used, numbers being expressed as coefficients of powers of ten. Thus, $351 = .351 \times 10^3$; $0.00351 = .351 \times 10^{-2}$. For convenience, however, 50 is added to the exponent. The number 123.4, for example, is represented by the number pair 53 and 1234, and the number 0.000 1234 by the pair 47 and 1234.

Often, a programmer can use subroutines to simplify his work. These are programs for specific purposes developed previously for a specific make of computer. For example, a subroutine may be used for computation of square roots or trigonometric functions. Or it may be used for an iteration procedure for solution of equations or calculation of simple-beam stresses. The machine can be instructed to shift into a subroutine at an appropriate point in a program, then return to the normal sequence of steps when the subroutine has been completed.

Also, to simplify and speed up programming, much work has been done recently by computer manufacturers in the development of automatic coding, which uses electronic computers to translate ordinary English and mathematics into machine language. Two methods are now in use.

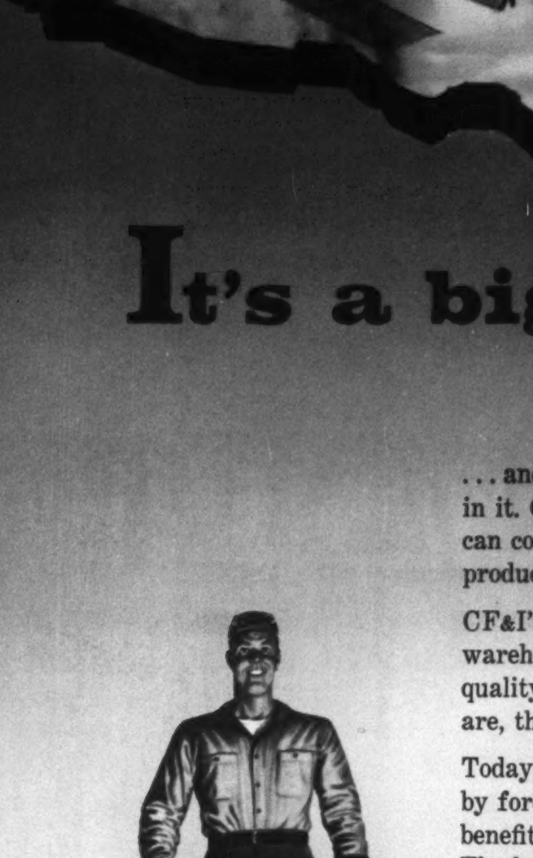
One involves a compiling routine: Coded instructions are stored in subroutines for the translation of simplified instructions into machine language. (This substantially reduces programming, since one written instruction is translated into many machine instructions.)

The simplified instructions are placed in the computer input, and the output is a program recorded on cards or tape for future use as part of a coded program for solving a problem. Now, for example, a programmer can write A*B, when he wants A multiplied by *B* or SQRT X when he desires the square root of X, and the computer will automatically perform the operation. For example, the first four instructions of



Sample flow chart for beam design.

It's a big country...



... and the construction industry is one of the biggest in it. On job-sites anywhere in this broad land, contractors can count on prompt delivery of CF&I steel construction products. This is one of the meanings behind the Image of CF&I.

CF&I's steel mills and plants, sales offices and warehouses can furnish you with a wide range of quality steel products. No matter where you are, there's a CF&I plant or warehouse to serve you.

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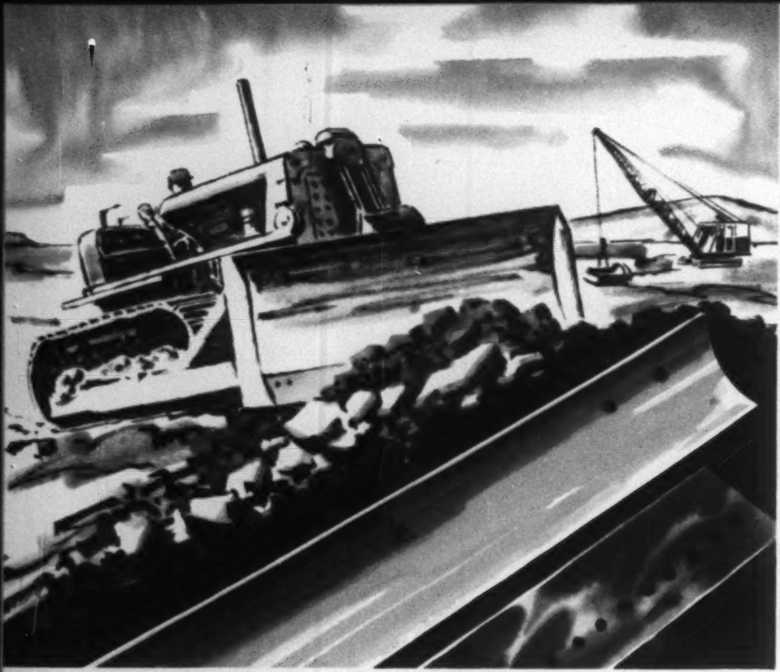
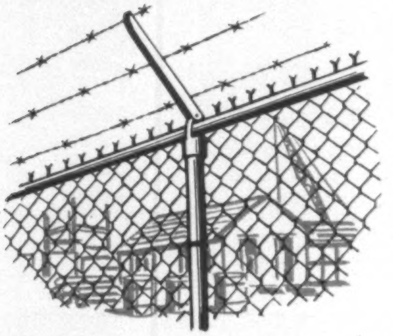


CF&I Steel Products



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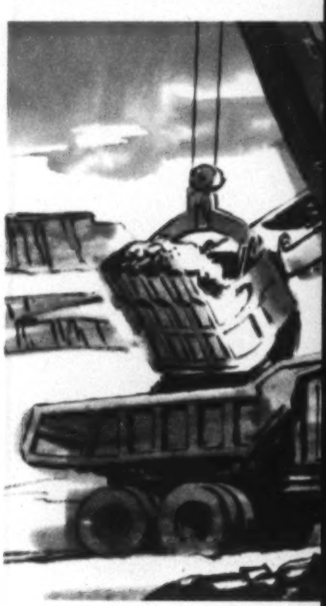

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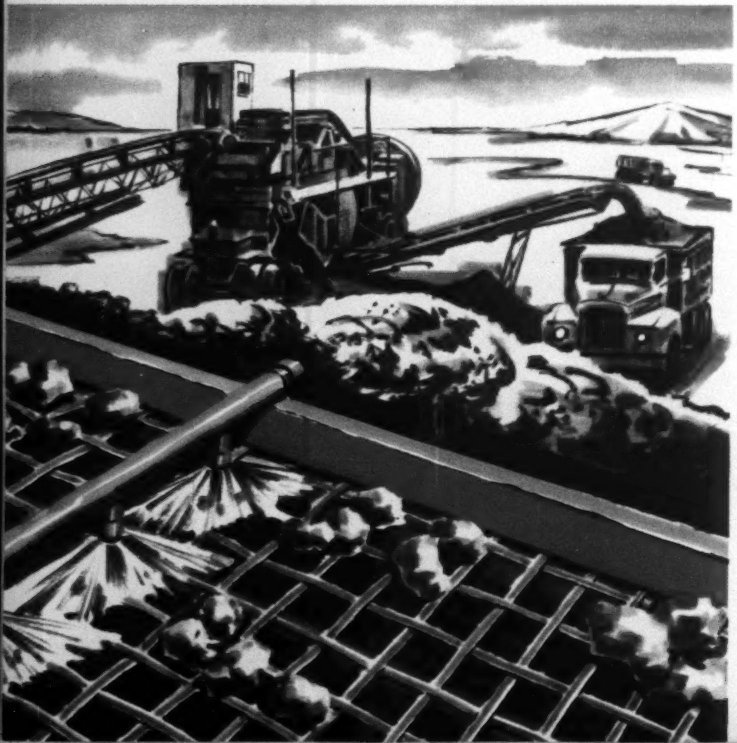

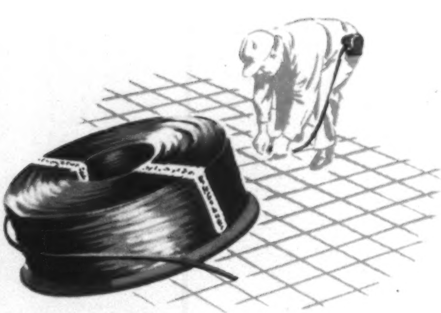

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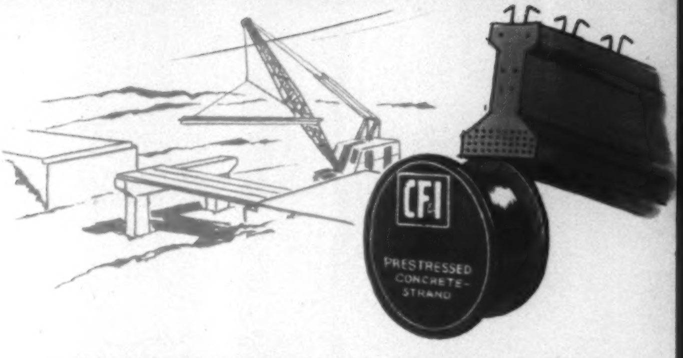

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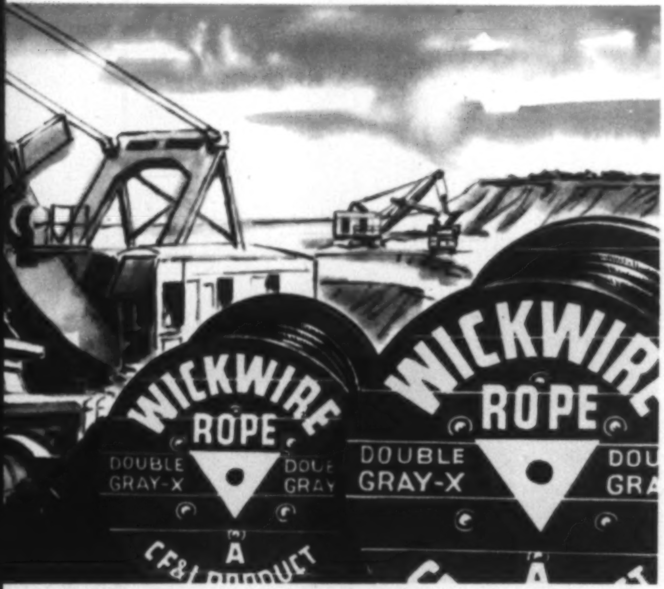

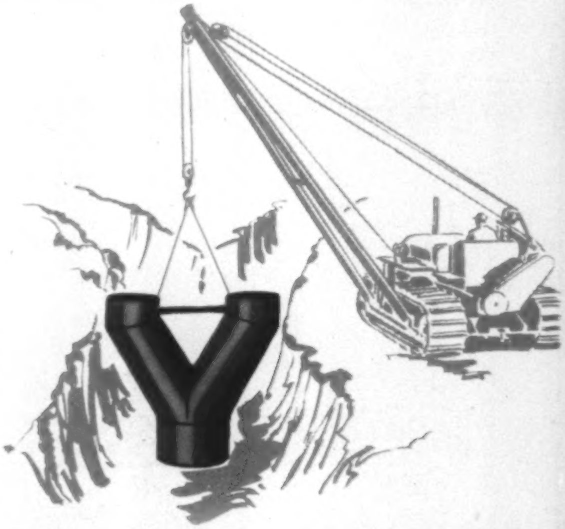

FABRICATED STEEL PLATE: CF&I's Claymont plant has facilities to produce a wide variety of fabricated plate products for structural use in all shapes, sizes and gages, from carbon, alloy or stainless-clad steel. Prompt delivery is also assured on welded steel girders.

WIRE ROPE: CF&I offers a line of safe, dependable wire ropes in many sizes, constructions and grades. You can choose a rope that best resists abrasion, bending, fatigue or crushing. For extra strength and extra-long rope life, specify our new Double Gray-X. CF&I-Wickwire Wire Rope is furnished through a network of distributors for swift delivery to any job site. Complete line of Wire Rope Slings also available.

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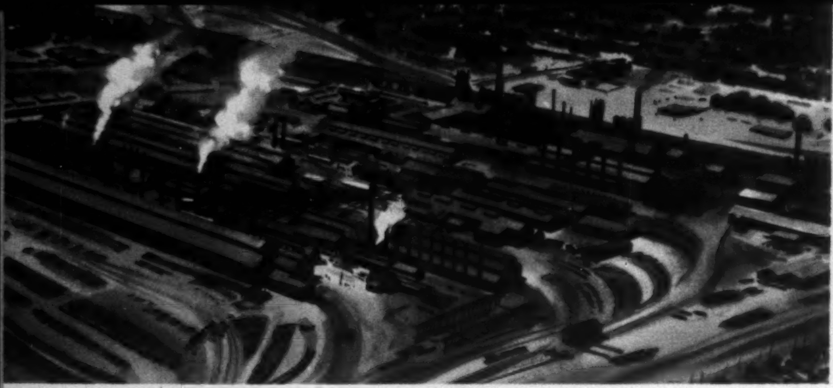
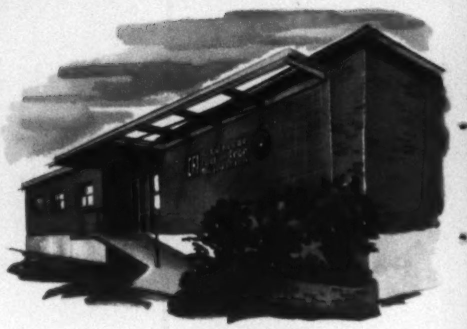


CF&I's Colorado steel-producing plant makes many steel construction products.



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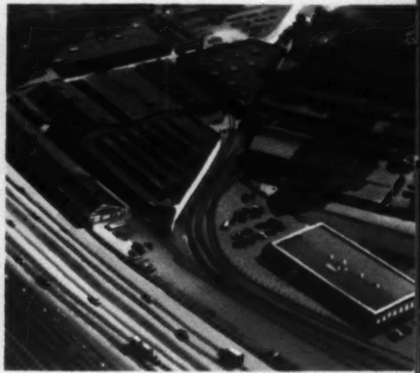

Contributing to the growth of the west are CF&I's California plants.

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the sample problem on p. 54 can be succinctly written as S = .075 *W *L.

A second type of automatic coding involves an interpretive routine: Symbols or simplified instructions are stored in the memory as subroutines. Then, when a simplified instruction is given, the computer executes the corresponding subroutine, automatically translating the instruction into machine language and implementing it. If, for example, the programmer wants the square root of X, he writes a code number signifying square root, and the machine selects the proper subroutine and extracts the root.

A vital and time-consuming part of the programmer's duties is to check the program, after it has been written. Mistakes may have been in analysis, logic, programming and coding. (Chances of a computer making an undetected mistake are small, since most machines have self-checking circuitry and will give a warning signal if something goes wrong.)

"Debugging" is usually done systematically for all programs. In general, a computer solution is compared with one or more obtained by some other means and known to be accurate. If the computer's answers agree with the known solutions, the program may be assumed correct. If the answers differ, a check must be made to locate the errors and their sources.

The first step is to check intermediate results to determine what parts of the program may be faulty. Then, as discrepancies are spotted, the components are checked step by step until all mistakes have been found and corrected.

L. R. Schureman, chief of the Electronics Branch, Bureau of Public Roads, estimates that programming operations up to the coding point require 80% to 85% of total preparation time; coding and debugging the program take about 15% to 20% ("The Electronic Computer in Highway Engineering," Journal of the Highway Division, American Society of Civil Engineers, Vol. 85, No. HW 3, Sept., 1959).

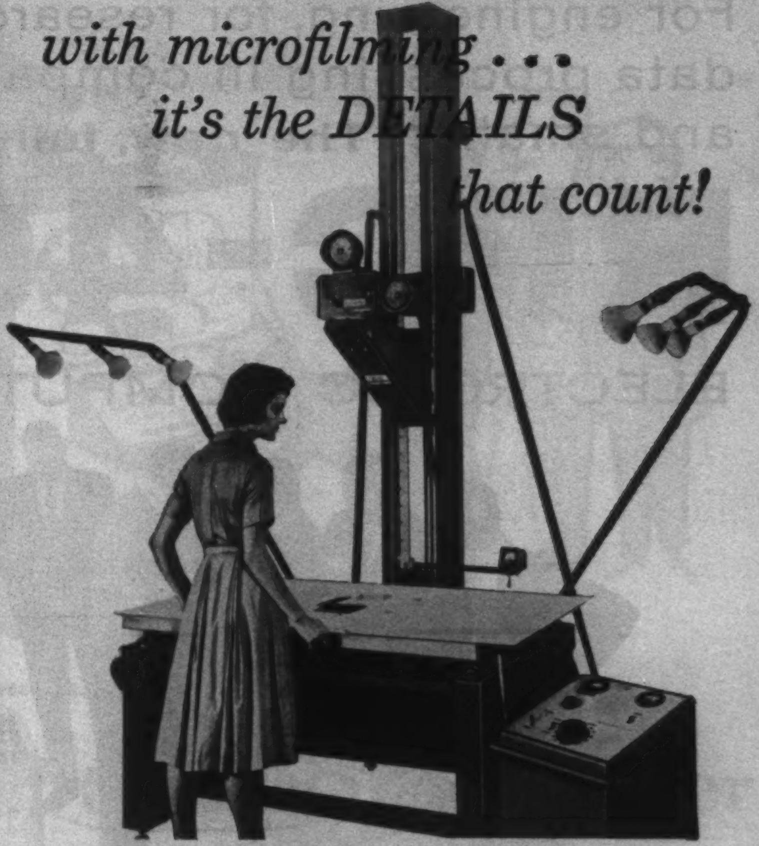
Several good books on computers and programming are now available. Here are the names of a few.

Jeenel, J. "An Introduction to Programming for Stored-Program Calculators," McGraw-Hill Book Co., 1959.

Wrubel, M. H., "A Primer of Programming for Digital Computers," McGraw-Hill Book Co., 1959.

McCormick, E. M., "Digital Computer Primer," McGraw-Hill Book Co., 1959.

Andree, R. V., "Programming the IBM 650 Magnetic Drum Computer and Data-Processing Machine," Henry Holt & Co., 1959.



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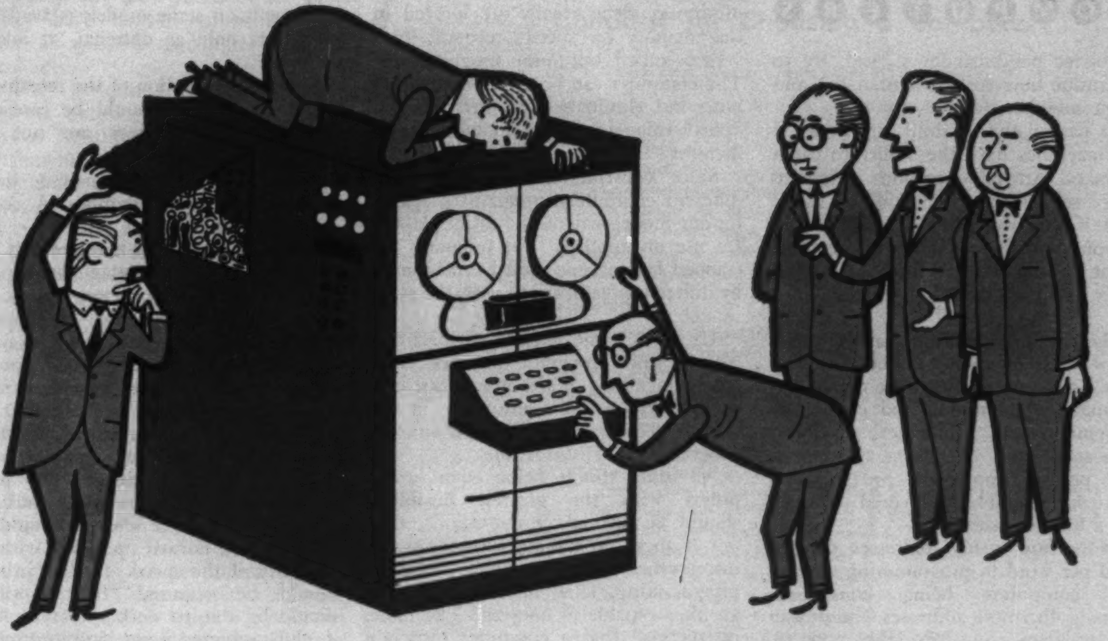


It's a matter of comparing and checking the details. Here are some hints on . . .

How to Select the Right Computer

Picking the right digital computer requires careful analysis. There are dozens from which to choose, and not all are capable of meeting an organization's needs. Furthermore, costs rise rapidly with a machine's capabilities. **For economy's sake, the least expensive, capable machine is the ideal selection.**

To obtain information that would be useful in choosing a digital computer, ENR requested data from computer manufacturers on machines that civil engineering organizations would be likely to buy or rent. The survey was limited to general-purpose or scientific digital devices that would sell for under $500,000 and rent for about $10,000 per month or less. The results of the survey are presented in an accompanying table.

This information should be considered a rough guide. Not all characteristics that computer experts may consider important are reported in this table. And while the information is the latest available, it may become obsolete in a very short time—designs of the machines are continually being improved; new models appear on the market at frequent intervals and existing ones may be withdrawn at short notice. Price, too, is subject to change.

Also bear in mind that the capabilities of computers may be substantially increased with optional equipment, at added cost. And sometimes some characteristics may be improved by sacrificing other desirable capabilities. For example, some machines that normally operate with a fixed decimal point can handle floating-point computations, but with reduction of storage capacity in the memory.

- **The most important consideration in picking a computer is whether a machine can handle the types of work encountered by the organization.** A computer that will be idle more than half the time because there is not enough work it is capable of handling is a poor buy. Similarly, a machine that is "too good" is unnecessarily expensive.

Consider first the memory capacity of those computers that lie in the approximate price or rental range that appears practical. A machine that has inadequate storage for even a small percentage of the work for which it is to be used is a bad choice. But note that optional equipment—such as extra drums or disks or magnetic tapes—often may be available to supplement a computer's ordinary storage capacity.

In examining storage potentials, consider also the type of memory. Magnetic cores are preferable to magnetic drums or disks. Cores simplify programming and give immediate access to stored data.

Next, see how many digits can be handled. A machine that cannot operate normally with the required number of digits for the organization's work is a poor choice. Some computers, however, are equipped for double precision and thus can carry twice as many digits as required for ordinary operation. But this is usually done at a sacrifice of storage capacity.

Now look closely at the cost of buying or renting. The amount an organization is willing to pay for use of a computer that meets storage and digit requirements undoubtedly will reduce the number of eligible machines to relatively few. In studying costs, also take into account the added expense of auxiliary equipment that may be needed. There may be extra charges for such items as alphanumeric typewriters or line printers, extra magnetic-tape memory stations, punchers, sorters, collaters, various types of converters and tape or card-sensing units.

The next step is to examine in detail operation of the eligible computers. Are their components reliable? If possible, find out from users of these models how much downtime has been experienced, and for how long they have been out of service per breakdown. And, try to determine how costly maintenance and repair may be.

As part of the reliability study, see if the machines have the ability to catch mistakes. Are all operations automatically self-checking, including signs? And if an error should be found in computations, programming, coding, input or output, can it be corrected easily and with little lost time?

- **The reliability analysis may eliminate a few of the machines under consideration. To choose between the remainder, compare programming and coding requirements next.** Since these are costly, time-consuming operations, computers that permit simple, fast programming and coding should be favored in reaching a final decision.

Note how many addresses can be used per word in programming each of the computers being considered. Usually, the more addresses, the shorter the program. Similarly, the more instructions that can be given in each word, the shorter the program.

Programming is simpler if instructions can be written in English. So see if the eligible computers permit this, and if so, at what sacrifice of other desirable capabilities, such as storage capacity and speed of operation.

Type of memory also should be considered when examining programming requirements. Magnetic cores give almost immediate access to data. With other types of memory, however, several milliseconds may be consumed per item, and to keep access time to a minimum, data usually are located in the memory for speedy retrieval by a system called optimum programming. The computer can be used for this purpose; but elimination of this step is a "plus" value for machines with a core memory.

Since construction is different for different computers, programs prepared for one model may not be easily adapted for use on another. But programs developed for any one model can be used by different organizations with the same model.

Users of some makes of machines have formed program libraries from which members of the group can borrow. There is some advantage in obtaining a computer model for which a program library is available.

All other things being equal, computers with the greatest flexibility should be favored. For example, find out if they can handle compiling and interpretive routines, which simplify programming. How many instructions are they capable of obeying? The more instructions that a computer responds to, the wider the variety of operations it is capable of executing.

Some machines, by addition of auxiliary equipment, can be adapted to a wider variety of tasks than indicated for the basic system. If such equipment is needed, it is wise to check on availability and cost. On the other hand, it is not safe to assume that any specific model can work with the auxiliary equipment that may be desired; this capability should be checked with the manufacturer. Also worth checking is the equipment the manufacturer supplies for the base price—standard equipment on some models is available on others only as optional, at added cost.

Details of operation of the remaining eligible computers should be carefully studied. The machines are not all equally easy to operate.

At this stage of the analysis, those that appear more complicated could well be eliminated.

Consider manpower requirements for operation. Some computers can be easily handled by one person; others require several. However, manpower requirements are not grounds for rejecting a machine; they are part of operating costs and should be taken into account in cost studies.

If all other things are equal, selection of a computer may hinge heavily on its input-output capabilities. If the speed of magnetic tape is going to be needed often, the computer selected should be equipped for normal operation with it. Similarly, if the speed of a line printer should be required, the computer should be able to work with one. And if alphanumeric input and output is desired, it should be capable of meeting these needs.

Floating-decimal-point computations are a convenience. Preference should be given to computers that can perform these without loss of storage capacity or sacrifice of speed.

The number of arithmetic registers a computer has may or may not be indicative of greater operating speed or flexibility or easier programming. Some computers, for example, work on an entirely different principle from the others and don't have any arithmetic

Important Characteristics of Small and

	Information Systems 609-1	Honeywell 800	Royal Precision LGP 30	Royal Precision RPC-4000	Alwac III-E	Remington Rand	Burroughs E101
Vacuum Tubes—VT or Transistors—T	T	T	VT	T	Both	T	VT
Input Equipment†	PT,NG	MT,PT,PC,T	PT,T	PT,T	MT,PT,PC,T AC,CF	MT,PC,inquiry, control console	PT,PC
Output Equipment†	PT	MT,PT,PC T,LP	PT,T	PT,T	MT,PT,PC,T,LP	MT,PC,LP	PT,LP
No. digits per word	12	12	9	9	9	10	12
Addresses per instruction	1	3	1	2	1	2	1
Instructions per word	2	3	1	1	2	1	1
Internal memory	core	core	drum	drum	drum	drum	drum
Memory capacity—words	4,096	4,096	4,096	8,008	4,096	5,000	220
Average access time—microseconds	720	6	8,000	8,500	4,000	425	8,500
Decimal point	fixed	fixed	fixed	fixed	fixed	fixed	fixed
Alphanumeric?	yes	yes	yes	yes	yes	yes	no
Arithmetic registers	2	3	1	4	3	4	2
Index registers	yes	yes	no	yes	yes	yes	no
Purchase price	$90,000	$500,000	$49,000	$87,500	$76,950	$425,000	$38,325
Monthly rental		$11,000	$1,100	$1,750	$2,500	$8,400	$1,000

* Equipment not listed here usually is optional †PT—paper tape, MT—magnetic tape, T—typewriter, PC—punched cards, LP—line printer, NG—number

registers in the conventional sense. They have built-in tables that contain all possible two-digit sums and products.

They perform arithmetic operations by an automatic find and transfer answer routine. The role of the arithmetic registers in each computer should be carefully analyzed to determine the advantages and disadvantages of each arrangement.

Index registers, on the other hand, are a definite advantage. They simplify programming and machine operation, because they enable addresses to be modified automatically. Hence, preference should be given to computers with index registers.

Over-all speed of computing is an important factor, but not a controlling one. If all other things are equal, the faster machine is the better buy.

The design of computers also is important, but not controlling. A solid-state (transistor) device has many advantages, but vacuum tubes perform satisfactorily. Compactness is an asset; but unless space is tight, not essential. Power requirements vary for different computers; but these effect operating costs and should be included in cost studies.

Cooling requirements may at times be critical; but usually they, too, are part of the operating-cost picture. And weight should be checked, mainly to be certain that there will be no support or moving problems.

Such an analysis as just described is indeed lengthy. It is worth making, though, since use of an electronic digital computer involves a substantial investment of time, staff and money.

Checklist for Choosing a Computer

(Items listed in approximate order of importance)

☑ **I. Capacity to carry out known or anticipated computations**
  1. Sufficient storage capacity (memory)
    (a). Type of memory
    (b). Speed of access to memory
  2. Number of decimal places that can be handled
    (a). Digits per word
    (b). Variable length words
  3. Cost—purchase or rental
  4. Availability and cost of auxiliary equipment

☑ **II. Reliability**
  1. Reliability of components
  2. Automatic self-checking, including signs
  3. Easy error correction
  4. Maintenance and repair requirements and costs

☑ **III. Ease of Execution**
  1. Simplicity of programming and coding
    (a). Number of addresses per word
    (b). Number of instructions per word
    (c). Programming in English
    (d). Necessity of optimum programming
    (e). Availability of programs from a library
  2. Flexibility
    (a) Compiling and interpretive routines
    (b). Number of instructions computer obeys
    (c). Need for auxiliary equipment at extra cost
  3. Ease of operating the computer
  4. Manpower requirements for operation
  5. Input and output
    (a). Speed
    (b). Alphanumeric
    (c). Printing of results
  6. Fixed or floating decimal point
  7. Number of arithmetic registers
  8. Number of index registers
  9. Speed of computing

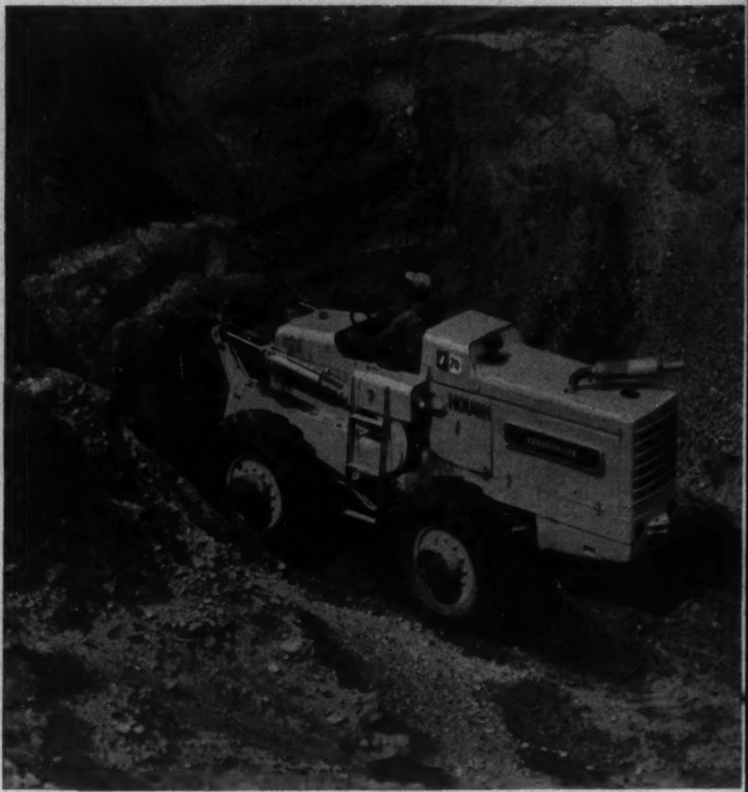
☑ **IV. Machine design—transistors or vacuum tubes**
  1. Compactness
  2. Power requirements
  3. Cooling requirements
  4. Weight

Medium-Size Electronic Computers*

Burroughs 205	Burroughs 220	IBM 1620	IBM 650	Bendix G 15	Bendix G 20	RCA 501	Readix	Control Data 160	Monroe Monrobot Mark XI
VT	VT	T	VT	VT	T	T	VT	T	T
MT,PC,PT,T	MT,PT,PC,T	PT,T	PC,MT,PT	PT,T,PC,MT	PT,T,PC,MT	MT,PT,PC	MT,PC,PT,T	PT,MT,T	PT,T,PC
MT,PT,PC,T LP	MT,PT,PC,LP	PT,T	PC,MT,LP	PT,T,PC,MT	PT,T,PC,MT,LP	MT,PT,PC	MT,PT,PC,T	TR,PT,MT,T,LP	PT,T,PC
10	10	variable	10	7	8	variable	10	5	9
1	1	2	2	2	1	2	2	1	1
1	1	1	1	1	1	2	2	1	2
drum	core	core	drum	drum	core	core	drum	core	drum
4,080	2,000+	2,000	2,000	2,176	4,096	2,300 per sta.	4,000	1,024	1,024
8,500	10	20	2,400	14,500	5	15		20	6,000
floating	floating	fixed	fixed	fixed	floating	fixed	both	fixed	fixes
yes	yes	yes	no	yes	yes	yes	yes	yes	yes
2	2	0	1	4	4	3	4	2	1
yes	yes	no	no	no	yes	yes	no	yes	no
$135,000	$320,000	$74,500	$182,400	$49,500	$300,000	$460,360	$135,000		$24,500
$3,900	$7,800	$1,600	$3,750	$1,485	$6,500	$10,000	$3,200		

generator, AC—analog-to-digital-computer converters, CF—curve followers, TR—trend recorders

Series B Model H-70 Model H-90 NOT NEW but . . .



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with numerous improvements that give INCREASED PRODUCTION and BETTER PERFORMANCE

"PAYLOADER" leadership over the years is based on superior design, construction and performance of each Model. And "PAYLOADER" leadership is maintained through a policy of progressive engineering. Engineering and research staffs are continually developing and testing new materials, methods, and designs, all directed to improve "PAYLOADER" performance in terms of serviceability and increased output.

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Peak Lift . . . . 18,000 lbs.

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MORE STABILITY: Wheelbase is extended and wheel tread is widened which, along with greater machine weight, greatly increases the balance and stability of the machine for ANY working condition.

MORE TRACTION AND FLOTATION: Standard tire size is increased to 18:00 x 25, insuring more traction and flotation whenever they are needed.

MORE STRENGTH: Front axle, main frame and other structural parts have been strengthened to meet the greater work potential of which this machine is capable.

TRANSMISSION AND TORQUE CONVERTER: Major improvements have been accomplished in the full power-shift transmission and the torque converter, resulting in superior throttle response and operating characteristics.

AIR BRAKES: New air brakes are standard equipment and give more positive action with less operator effort than ever before.

PAYLOADER®

Model H-70 Series B

CAPACITY: Operating . . . . 7,000 lbs.
Peak Lift . . . . 13,000 lbs.

MORE POWER: Available with a larger diesel engine (Cummins 124 hp). Also available with IHC gasoline engine of 110 hp, and GMC diesel engine of 105 hp.

MORE LIFTING POWER: Improvements in the boom arm design and bucket control linkage provide more digging power especially for digging below grade.

HYDRAULIC RESERVOIR: The capacity has been increased to gain greater efficiency for the operation of the many hydraulically-actuated allied accessories that are available, such as: 4-in-1 bucket; side boom; back-hoe.

Series "B" H-90 PAYLOADER

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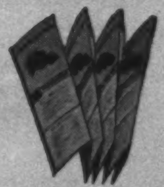

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Company
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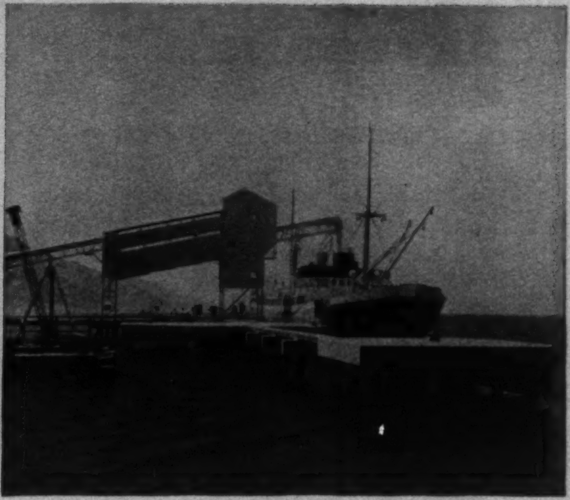
4-B-1

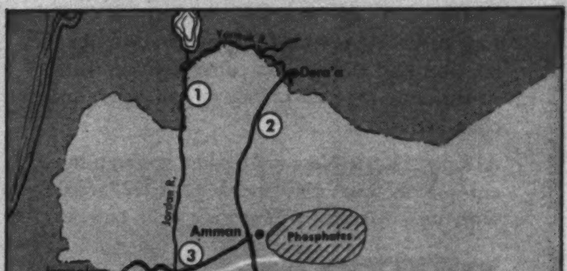
BUILDINGS—The new Grand Hotel in Amman.



HARBORS—New Aqaba port handles phosphate exports.

Jordan Enjoys a

ROADS—This new one snakes from Amman to the Dead Sea.


Yarmuk R.
Dera'a
Jordan R.
Amman
Phosphates
Jerusalem
Bethlehem
Dead Sea
JORDAN
Phosphates
Desert Highway
Ma'an
Ras en Naqb
Proposed R.R.
Hedjaz R.R.
Aqaba
① East Ghor Canal Project
② Amman-Syrian Border Highway
③ Amman Dead Sea Highway
④ Dead Sea-Jerusalem Bethlehem Highway
⑤ Desert Highway
⑥ Hedjaz R.R. Rehabilitation
⑦ R.R. To Aqaba
⑧ Aqaba Port Development

MAJOR CONSTRUCTION—Propects are scattered.

IRRIGATION—Primitive excavation methods produce a modern canal.

Construction Boomlet

Relative calm in the Middle East and ready cash from the U.S. have started a development boom in the kingdom of Jordan.

The development activity may not appear impressive when compared to what's going on in the larger, oil-rich countries in the area. But for a young desert nation of 1,500,000 people, half of them refugees, the upsurge of construction activity is spectacular.

The activity is important enough to have attracted several American and European engineering companies to the country—some of them willing to gamble on Jordan's future political and economic solvency by offering everything from surveying, supervision and construction to financing and operation of completed projects.

Unlike richer neighbors, Jordan has no grandiose master plan for development or industrialization. So far it hasn't been able to afford the luxury of long-term planning. Political uncertainty inside Jordan and on its borders is one reason; another is a shortage of capital. Jordan has neither oil revenues, nor great water resources, nor prospects of major industries. The kingdom has had to depend on foreign funds to balance her budget, let alone invest in development projects.

Next to meager resources, Jordan's main trouble is its geographic location. Landlocked between Israel, Syria, Saudi Arabia and Egypt, the country has been totally isolated in times of crisis—and crisis has been the rule since the kingdom was carved out of the former Trans-Jordan and the Arab-held parts of Palestine in 1951.

Jordan's development planning has two goals:

- Get more tourists to the country's Biblical, Roman and natural sites faster and with maximum comfort.
- Get phosphates—Jordan's major export—out more economically.

Communications, therefore, are top priority in Jordan's modest development schemes—highways for tourists and phosphate- and potash-laden trucks; a free port and railroad for exports of phosphates and imports of fuel and other essentials.

The modern deep-water port at Aqaba, on the Gulf of Aqaba, is the first major development work completed so far in Jordan. To landlocked Jordanians, it is also the most important national scheme, being their only direct access to the sea and world markets.

The new port, which was made possible by a $7-million British loan, has three sections: a deep water general cargo berth; a phosphate loading berth; and an oil products terminal and tank farm.

It is no longer necessary to discharge on anchorage into lighters. Cargo is now unloaded direct to shore at a 525-ft-long concrete wharf, sufficient for ships up to 20,000 tons deadweight capacity.

The wharf is built as a reinforced concrete deck on steel box piles with a retaining wall of steel sheetpiling in the back. Dredging was not necessary since the water depth at the wharf, as well as at the phosphate berth to the south, is 33 to 36 ft. This depth is attained by a steep sloping seabed so that the wharf structure rises much higher above its foundations at the front than at the back. This led to placing the transit shed 98 ft back of the water face of the wharf where its loads can be supported more economically. Cargo will be moved between shipside and shed by tractor trailers and fork-lift trucks. Plans are also under way to install two 3-ton gantry cranes.

Since phosphate is mechanically loaded by belt conveyors, a solid wharf was not needed for these shipments. Instead, five strong dolphins with a high loading tower in the center form the more than 210-ft-long water front. The dolphins consist of reinforced concrete decks supported by steel piles.

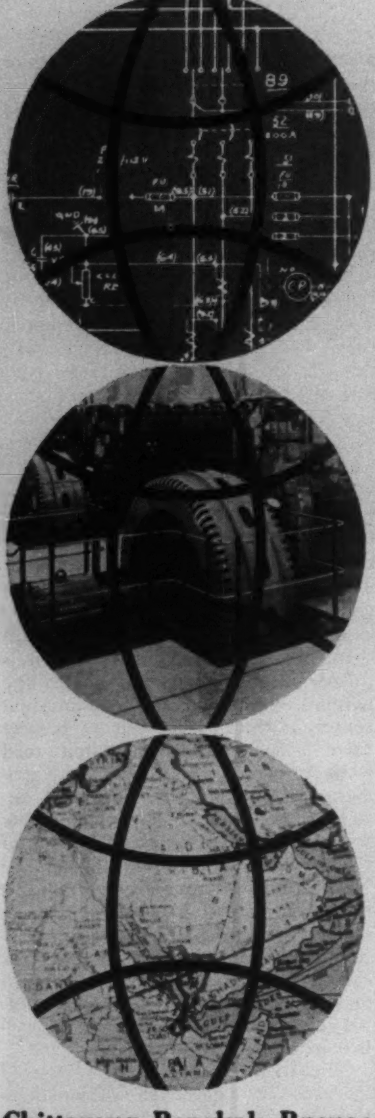
The Aqaba port cannot do its full share in Jordan's economy unless it is linked by good roads and rail to the nation's production and consumption center in the North. But at present there is only a rough mountain road from Amman to Aqaba. Its sharp gradients and hairpin curves make it unsuitable for truck traffic. The usable section of the Hedjaz Railway halts at Maan, with an extension to Ras en-Naqb, from where phosphate is also loaded on trucks to Aqaba.

Lack of funds had delayed construction of a new north-south highway across the desert east of the Moab mountain range. However, recent British development loans of about $7 million have speeded up work.

The recently completed section of the east-west highway from Amman to the Dead Sea, 336 miles, meets the old Amman-Jerusalem highway just west of Jericho. A joint project of the Public Works Ministry and the U.S., this is the first road ever built in Jordan from an aerial survey, and the first one to be built on the compacted earth base and asphalt-bound gravel principle. Cost of the Amman-Dead Sea section is more than $3 million.

Elevation differences on the completed section range from 280 ft above sea level near Amman, in the Moab mountains, to 328 ft below sea level in the Jordan Valley, a horizontal distance of 12.4 miles. The most important bridge—380 ft long—is on the Jordan River. It is a plate girder type with concrete deck and two pedestrian safety sidewalks.

The Amman-Dead Sea highway will eventually continue to Jerusalem and Bethlehem—another 38 miles. Brown Engineers International, New York



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City, is doing the complete survey and eventually will design this extension.

The Jerusalem-Bethlehem section of the highway will be relocated according to U.S. Bureau of Public Roads standards. There are now two roads from the Jordan-held Old City of Jerusalem to Bethlehem. One was built over the Judean hills by the Arab army during the Arab-Israeli war in 1948; the other, more recent, is entirely on the Arab side of the armistice line until it meets the main highway—which has been made useless by the armistice demarcation.

Other highway proposals for Jordan include a third north-south highway—this one for farm areas in the Jordan Valley depression, down the eastern shores of the Dead Sea and then to Aqaba through Wadi Arabia—and an extension of the East-West Jerusalem-Amman highway eastward to the Iraqi border and then to Bagdad.

The most immediate railroad project is rehabilitation of the 520 mile Hedjaz Railway.

The Jordan Development Board has also planned an extension of Jordan's only railroad from Maan to Aqaba, cutting across the steep badlands that isolate the seaport from the rest of the country.

Brown Engineers has offered the Jordan authorities a package proposal to do an economic and technical feasibility survey, then design and construct the line to Aqaba, taking payments for the work over a 15-year period.

Proposals for building developments are the vogue in Jordan.

Hilton Hotels International wants to build, manage and operate a hotel in Arab-held Jerusalem. The Jordan Hotels and Tourism Co., Ltd., has countered Hilton's offer by proposing Hilton take over the management of two other hotels. One, recently completed, is on the Dead Sea 1,300 ft below sea level. The other, now under construction, is on the highest hill overlooking Amman.

Brown Engineers has also made a bid for a government project to set up an industrial community near Amman. It provides for a grouping of Jordan's small manufacturing units in one area, pooling their resources for joint utilization of power, water and other services. The U.S. Point Four program has set aside some money for supervision of the project, but wants the capital to come from local sources.

The capital, Amman, is also in the midst of a building boom. It began during the early '50s as a result of the merger of Trans-Jordan with Arab-held parts of Palestine. The population has grown from 30,000 ten years ago to nearly 250,000. Most of the new buildings, however, are only three and four story construction.

The biggest project now under way in Jordan is the East Ghor Canal Development scheme—a five-year program begun in August, 1958. This is part of a master plan for the utilization of the Yarmouk-Jordan Valley waters. The plan was prepared in 1955 by Michael Baker, Jr., Inc., of Rochester, Pa., and the Harza Engineering Co., Chicago.

The scheme calls for diversion of water from the Yarmouk River into a tunnel and then to a main, concrete-lined canal 42 miles downstream. The development will use the gravity flow of the river to irrigate a large area.

Total cost of the project is $6 million for the main canal and $12 million for the distribution, irrigation and drainage system.

Initial phase of the project consisted of excavating 14.3 miles of the main canal, mostly by hand. This was completed by the East Ghor Authority with a work force of 850 men.

Last October, the Authority awarded the Italian firm of Imprese Veneti per Construzioni All 'Estero of Milan a $2-million contract for the digging and lining of a 3,210-ft-long, 11.8-ft-dia tunnel from the Yarmouk to the main canal; and the trimming and concrete lining of 14.3 miles of the trapezoidal shaped main canal.

In addition to supervision of the entire canal scheme, Harza International, the U.S. firm, has the contract for design of the irrigation, distribution and drainage system.

Around the world . . .

- **Underground oil**—The first large commercial oil pipeline in Great Britain may get under way this year. Esso Petroleum Co. Ltd., London, plans to lay a 10-in., 1.5-million-gpd line the 75 miles between its refinery in south England and a depot near London. It will be buried at least 3 ft deep. Esso hopes to start this year and finish by 1963.

- **Salzburg airport expansion**—Reconstruction work at Salzburg's airport will make it Austria's second largest commercial landing field. The major work under way is reconstruction of the main runway to 7,120 ft, and modernization of passenger and freight buildings.

- **Big plans for India**—The Indian government plans to spend $250 million building five fertilizer plants, estimated at $50 million each, as part of its third five-year plan.

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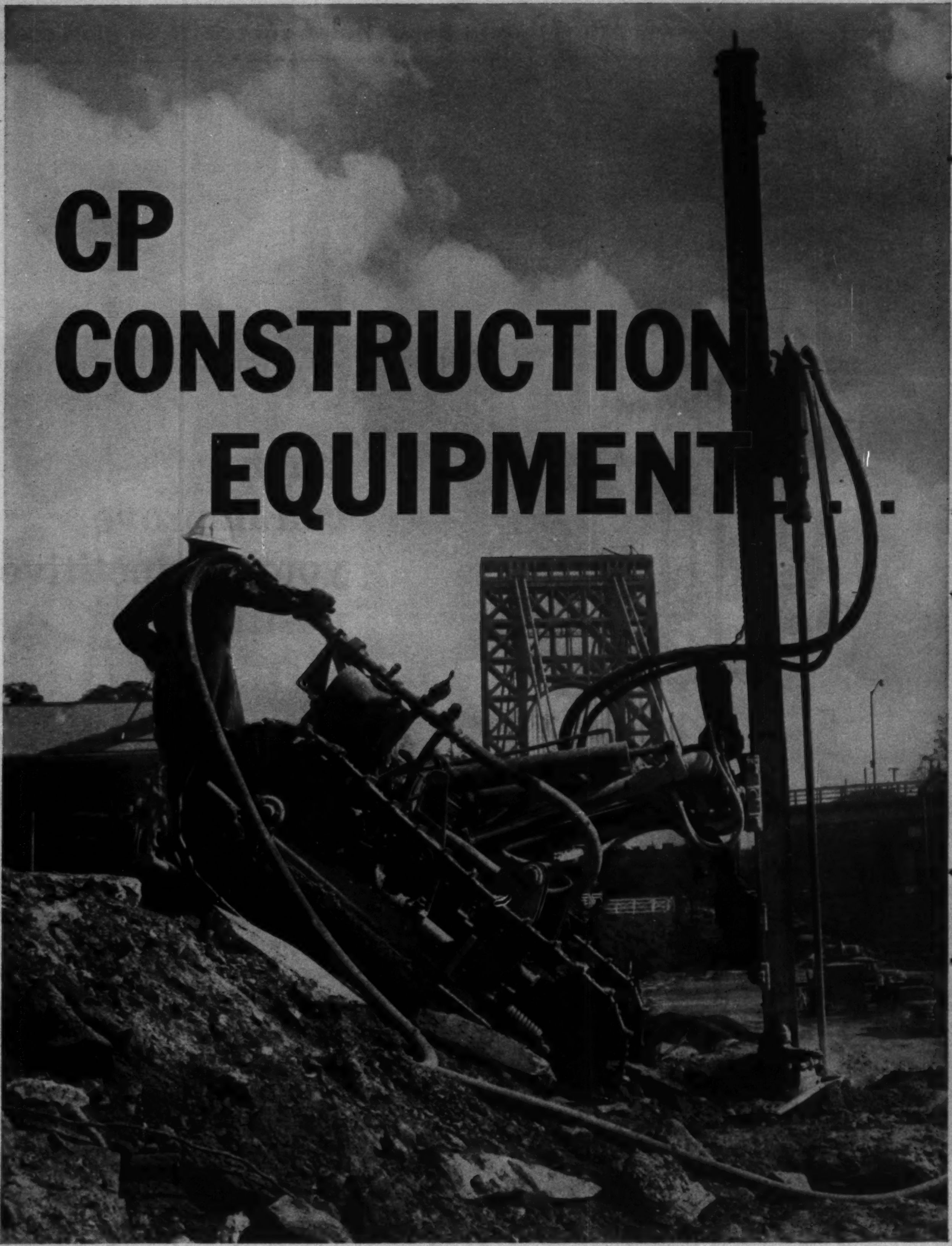
CP CONSTRUCTION EQUIPMENT . . .



G-800 TRACDRIL *adapts quickly to bad ground . . . automatic brakes insure operator safety and hold drill in position.*

CP-610 REVERSIBLE IMPACT WRENCH *packs solid power for fast rundowns and proper tightness.*

CP-117 DEMOLITION TOOL *and CP-125 "Power Vane" Rotary Compressor breaks pavement fast.*

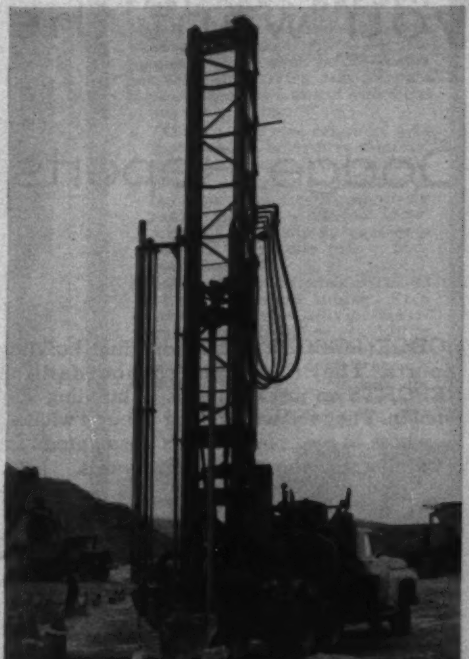
LICKS THE TOUGHEST JOBS YOU TACKLE

CP TRACDRILS, for example, built to take the hardest pounding any job can offer, insure a stable drill mount on the toughest ground you'll work. Drilling or tramming, all controls are easy to reach. And heavy-duty, fast-acting hydraulic cylinders quickly position drill carriage . . . for more productive drilling time. Safety insured by automatic brakes that take hold the instant traction motors are stopped. Hard-hitting 4½" bore Deep-Hole Drills sink 3" holes to 75 feet in hard, igneous rock . . . *fast!*

CP "POWER VANE" ROTARY COMPRESSORS, for example, are gaited to meet your varying air demands with constant, fuel conserving economy. "Power Vane" Rotaries are dependable performers that have proved they have the power and the stamina to stay with the roughest jobs you run up against. Capacities: 125, 250, 365, 600 and 900 cfm. Gasoline or diesel engine drive.

CP HEAVY-DUTY IMPACT WRENCHES, for example, have plenty of power for the toughest high strength bolting jobs . . . pre-bolting of structural members, or form bolting. Handle well in any position because of compact size — light weight. The CP-610, for example, is only 10½" long, weighs only 21 lbs. Favorite with bolting gangs everywhere. Torque Control models available.

CP REICHdrills, for example, are all-hydraulic, top-drive rotary drilling rigs, mounted on trucks or crawlers. All hydraulic means infinitely variable rotation speed and down-pressures to insure the operator the right combination of speed and pressure for every formation. Safety Torque Release minimizes drill breakage. Capacities to 16" hole diameter and 90,000 lbs. down-pressure.



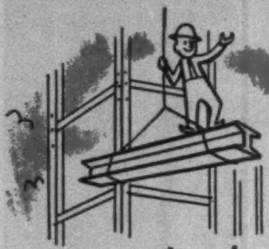
T-650 REICHdrill *truck mounted, with Hydraulic Barrel Loader. Hole size: to 7⅞"; down-pressure to 30,000 lbs.*

For full details, see your distributor, or write for Catalog 600 to:

Chicago Pneumatic *8 East 44th Street, New York 17, N. Y.*

AIR COMPRESSORS • PNEUMATIC TOOLS • AIR WRENCHES • REICHdrills • AIR-BLAST BITS • ROCK DRILLS

BEST way to better construction



contracts is to find more

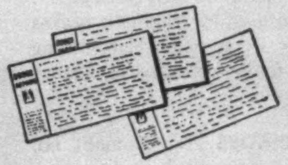
new jobs to pick from . . .

then concentrate on those you want

to handle ...when and where

you want them. How? With daily

Dodge Reports !!



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When you use **DODGE REPORTS**, you always know what's coming up. You don't depend only on invitations to bid. You concentrate on jobs you know will be profitable.

If you do business in the new construction field, you need **DODGE REPORTS.**

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Send me the book: "How General Contractors Get More Business in New Construction" and let me see some typical Dodge Reports. I am interested in the general markets checked below.

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GENERAL CONTRACTORS
F W DODGE
CORPORATION
Dodge Reports
HELP
GENERAL CONTRACTORS
GET MORE BUSINESS

Knocking out old kiln lining was tough work. It meant . . .

Careful drilling to place . . .

. . . Remote-shot charges.

Working With Caustic Barium Dust

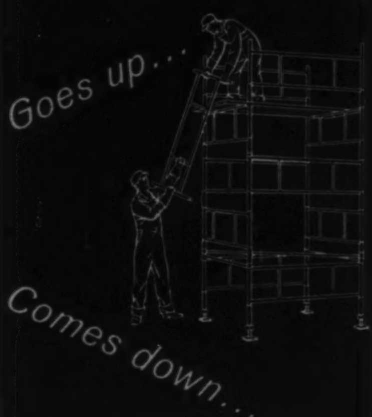
Salvagers dismantling the abandoned Glidden plant in South Baltimore, Md., found dynamite to be the best solution to a tough demolition problem. The most intricate operation was stripping brick lining from a 6-ft-dia barium kiln.

The kiln was a tube of ⅜-in. steel, 60 ft long, lined with 8 in. of tightly wedged radial firebrick. It had been sold, but on the condition that the brick be removed before delivery. Since the entire kiln could still be rotated, it was obvious that the removal of one or two longitudinal courses would permit the bricks simply to fall free.

But what first looked like an easy operation with jackhammers suddenly became grim business when it was found that the kiln was permeated with a barium residue. The fine powder rose in choking clouds when the jackhammers bit in. It was a highly caustic alkali, capable of burning away hair and fingernails like a powerful depilatory. It also ate into the workers' perspiring skin, causing painful burns. The jackhammer operation came to a sudden stop, and a call was put in to Burnbrae, Inc., a Baltimore dynamiting firm.

(Turn the page)

SELF-LOCK
SHORING-SCAFFOLDING


Goes up...
Comes down...

FAST!

NO NUTS, BOLTS FASTENERS NEEDED

Now you can erect and strip form work easier, faster and more economically than ever before—using new Self-Lock Shoring. Just compare these outstanding features with those of any other system.

- **FAST** . . . two men can erect a 14 foot tower in only three minutes, and take it down just as quickly!
- **SIMPLE** . . . by proper selection of only four basic frames, any tower can be erected in *one-foot increments.* Frames slip-fit together—no tools, nuts, bolts, pins or fasteners needed!
- **SAFE** . . . rugged frames are made of durable steel tubing. Free standing towers provide maximum strength and safety. Entire load is carried by vertical members—no need to cross brace.
- **DUAL PURPOSE** . . . frames are also ideal for fast, low-cost scaffolding work. Underwriters' Approved.

THE SELF-LOCK SECRET

Exclusive slip-fit joint with patented notch in each frame assures self-locking, self-aligning towers.

MAIL COUPON TODAY!

VEGA INDUSTRIES, INC.
6016 E. Brighton Ave., Syracuse 5, N. Y.
Please send full details on Self-Lock Shoring-Scaffolding.

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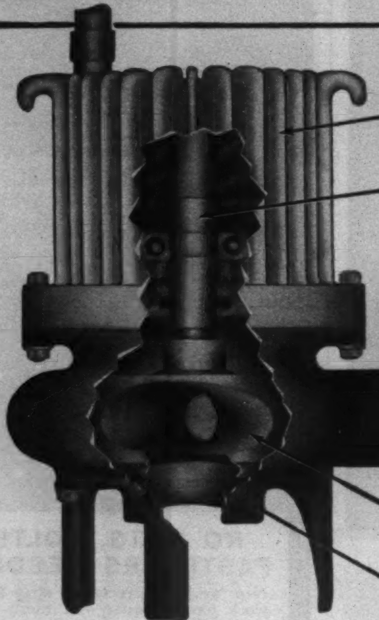
COMPANY ____________________
ADDRESS ____________________
CITY ____________ ZONE ____ STATE ______

Vega Industries, Inc.

YEOMANS NEW SUBMERSIBLE

Nonclog sewage and drainage pump—Series 9000



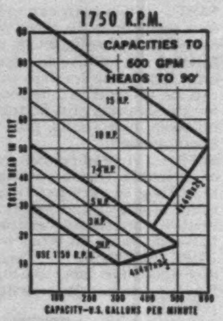
Heavy-duty motor specially designed for submersible operation . . . totally enclosed and oil filled to positively assure against water entering unit.

Pump-motor shaft is stainless steel for maximum protection against sealing problems. Liberally sized with large bearings.

Standard 4" discharge.

High strength cast iron, two-port impeller, hydraulically and mechanically balanced. Passes 2½" solids.

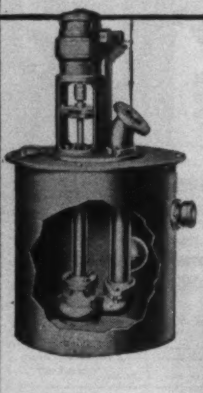
Separate suction plate, with high strength cast iron tripod, furnished to support entire unit. Design enables easy, quick access to impeller.



APPLICATIONS — Commercial and industrial buildings, processing plants, utilities, sewage plants, water treatment facilities, recreation parks and pools.

AUTOMATIC CONTROLS — Heavy-duty float switch with float and rig, or electrode control. In duplex installations, Yeomans "Interchanger" equalizes wear between the two pumps by alternating operation. In addition, the "Interchanger" starts the pump not in use when peak conditions call for extra capacity.

Complete details available from your Yeomans representative, or write the factory for Leaflet 9001.



SEWAGE AND DRAINAGE PUMPING CALLS FOR A SKILL OF ITS OWN

Vertical wet pit pump jobs are as individual as people. Each sewage and drainage job demands a certain type of unit, materials, packing, lubricants, bearings, and speed. If these variables are not properly combined, pump performance and life suffer.

Here's where Yeomans' 61 years of service to the building, industrial, and processing fields is invaluable. Here's where the "calculated feel" and know-how of Yeomans engineering pays off in extra long pump life and low maintenance.

On your next sewage and drainage jobs, ask for recommendations from the industry's leader. Call in your Yeomans representative and be sure. He's a specialist with a complete line of waste handling pumps. Look in Sweet's Catalogs or the yellow pages of the phone book.

YEOMANS

1999-1 N. Ruby St., Melrose Park, Ill.

P-5922

Working together, the blasting company and the salvaging firm first placed a 24-in. portable exhaust fan at the open end of the kiln. Then a Black and Decker electric drill was substituted for the air drill. A 1-in. bit was reground with a sharp bevel, and drilling by the two-man team was no longer a problem. The electric drill was fast and kicked up no dust.

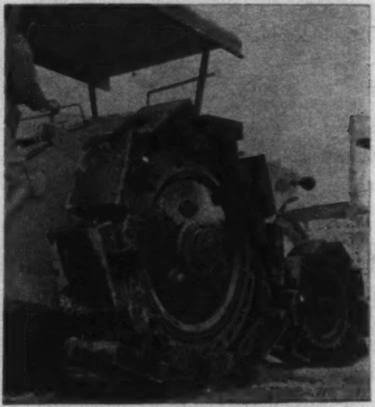
After some experimenting, the most efficient bore hole pattern was found to be three parallel rows 6 in. c-c with 6 in. between rows, and the center row staggered at 6 in. Each hole was loaded with ⅛-stick of Du Pont 40% Red Cross Extra and electric blasting caps ranging from instant to the fifth delay.

Each loading was fired with a CD-48 blasting machine from a point about 60 ft outside the kiln building. The shots averaged 8 to 10 holes each. Largest firing was 12 holes, cutting loose about 5 ft of the wedged bricks.

After each firing, the kiln was rotated several times to shake down the loosened brick, then allowed to stand for 15-20 minutes to let the fan exhaust the caustic dust.

Debris was dropped from the open end of the kiln into a metal bin. The bin was carried from the kiln building with a Hyster fork truck and transferred to a specially rigged Mack refuse truck.

Placement and firing of explosives plus complete insurance coverage was by Burnbrae, Inc., Baltimore. Drilling was handled by the prime contractor for dismantling, Potomac Machinery Associates, also from Baltimore.



The Round Wheels . . .

. . . of this German roller are always flat on the bottom thanks to a series of hinged blocks mounted on the wheel rim. The blocks are pivoted to provide a continuous broad, flat compacting surface as the wheel turns. Removal of single pin pivots permits changing the type of pad to suit varying materials or compaction requirements.

LIMA
ROADPACKER

LIMA ROADPACKER MODEL D

Compacts Fast, Wide and Deep on Macadam, Gravel, Crushed Rock, Sand, Soil Cement and Stabilized Bases

SAVE WITH SINGLE COURSE CONSTRUCTION

Lima Roadpackers meet the challenge—no other vibratory compactor gives you so many cost-saving job-speeding features . . . the reason why Lima Roadpackers are preferred by contractors throughout the world for fast production on highway and airport construction jobs.

Compare these profit-making features!

Heavy Vibrators

Six 437 pound vibrators deliver earth-shaking vibrations for deep, uniform densities. Vibrator units are completely sealed—no external moving parts. Vibrators are self-lubricated and need no daily maintenance. Required densities are quickly achieved. Macadam rock is tightly keyed, with screenings vibrated into voids in only three applications on most jobs. Compacts up to 600 tons per hour.

Infinite Speeds

20 feet per minute to 30 miles per hour! A fluid motor propels the machine while compacting. A dial selector gives compaction speeds to match any job including new high production requirements within a broad range of 20 to 95 feet per minute. Roadpacker can be anywhere on the job at a moments notice. Heavy duty transmission provides fast highway travel speeds to next job.

One Lever Instant Reversing

Compacts forward or reverse with one lever control—no gear shifts—no declutching—no stopping. With the Lima Roadpacker you have no lost time and no depression in the material being compacted when machine is reversed.

Variable Working Widths

End shoes fold back for a selection of 4, 5 or 6 shoe working widths. Easily folded by the operator alone, the Roadpacker carries unused shoes ready for wider working widths at any time. Folded end shoes permit Roadpacker to travel over highway.

Controls Up Front

Roadpacker controls are all grouped at operator's seat—engine gages and controls are mounted on dash panel. Foot accelerator in addition to hand throttle provides natural roading of Roadpacker.

Widener Attachment

Extension arm works shoes in a widening trench to 11" below the existing pavement. Quickly adapted to various width widening work; replaces trench rollers.

These are only a few of the advantages incorporated into the new rugged Lima Roadpacker, Model D. For complete information, see your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

LIMA

Shovels—to 6-cu. yd.
Cranes—to 110-tons
Draglines—variable

LIMA SUPER ROADPACKER

For the large construction jobs such as superhighways, air bases and earth-fill dams, Lima offers the Super Roadpacker with two rows of six hydraulically controlled vibratory shoes. Compacting widths up to 15 feet.

LIMA AUSTIN-WESTERN

Crushing, Screening and Washing Equipment

LIMA Construction Equipment Division, Lima, Ohio

BALDWIN · LIMA · HAMILTON

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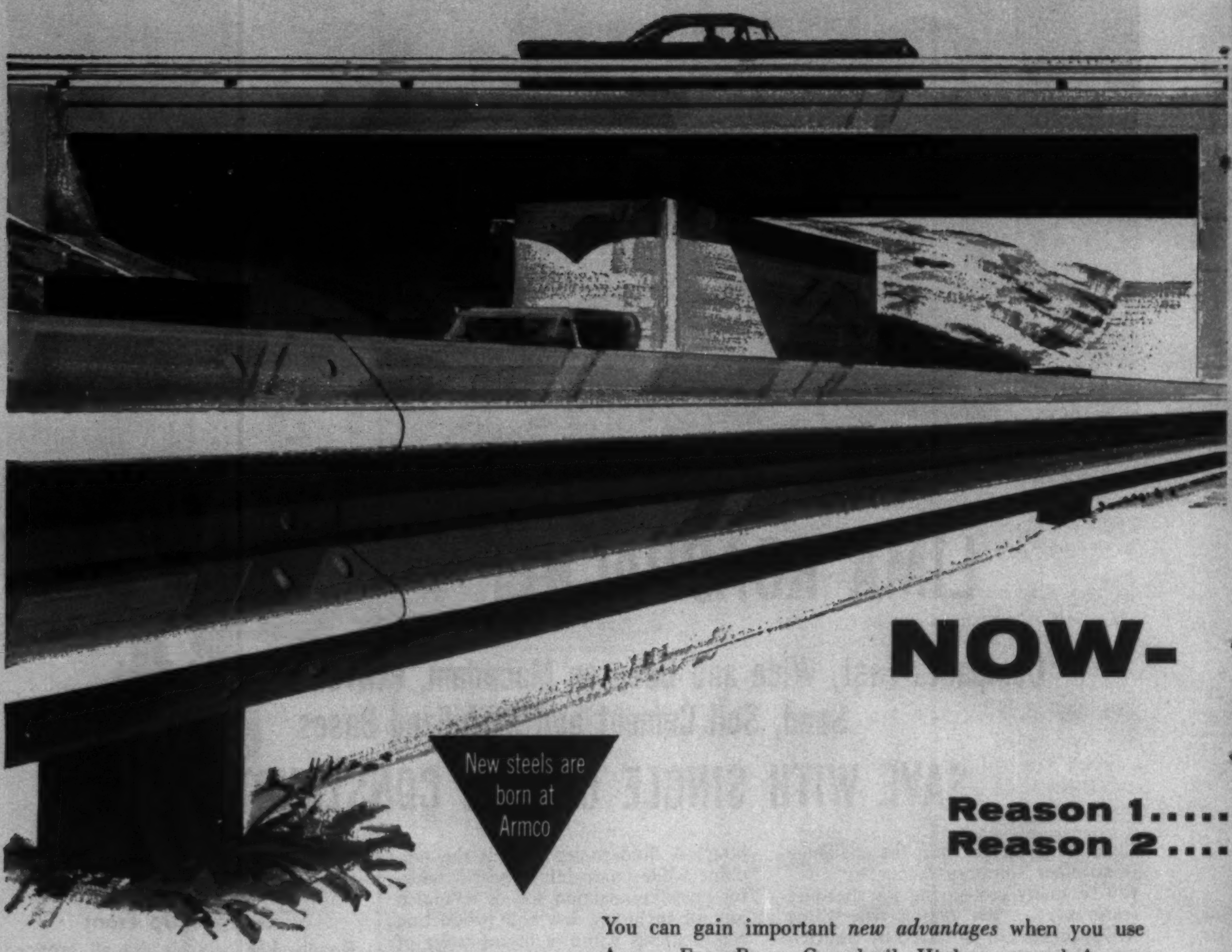
BALDWIN BLH LIMA-HAMILTON

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment



NOW-

Reason 1.....
Reason 2....

Condensed FLEX-BEAM Specifications

Gage: 10 and 12

Length: 12′-6″ and 25′-0″ (25′ sections supplied in 12-gage, galvanized steel only).

Coating: Shop applied, rust-inhibiting prime paint or Galvanized to meet ASTM A-93 (Class 2.5 oz. coating).

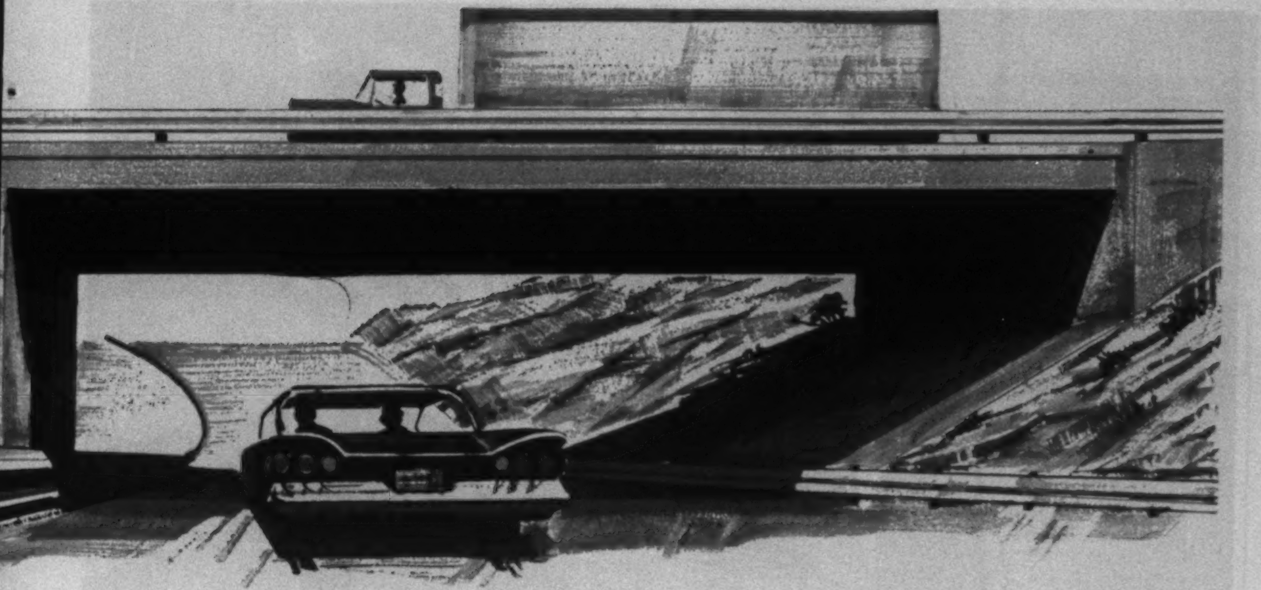
Shop-Curved Sections: Fit any radius from 5′ to 150′.

You can gain important *new advantages* when you use Armco FLEX-BEAM Guardrail. Highway-tested Armco FLEX-BEAM is now available with a protective zinc coating. It is supplied in double lengths—25-foot long sections—that speed installation. These double lengths eliminate five out of every ten splices. And the number of sections that must be hauled to the job site and handled is reduced by half. Of course, the single length sections of FLEX-BEAM continue to be available.

With galvanized FLEX-BEAM, the zinc coating provides surface protection for the metal—eliminating the need for painting. Or, if painting is desired for utmost visibility, it can be limited to the *face* of the rail. This is especially important for installations against walls or machinery, highway median strips, double-faced parking lot installations and similar uses where the back of the rail is inaccessible for maintenance painting. Total result is simpler, lower cost installation and maintenance.

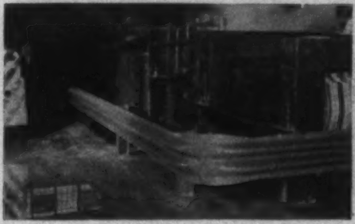
Send for free catalog

Send the coupon for the latest edition of the 12-page Armco FLEX-BEAM Guardrail catalog. Armco Drainage & Metal Products, Inc., 5880 Curtis Street, Middletown, Ohio.



--you have Two More Reasons for selecting Armco Guardrail

DOUBLE LENGTHS to speed installation and cut costs
GALVANIZED to simplify painting and reduce maintenance



FLEX-BEAM protects valuable machinery in plant.

FLEX-BEAM adds parking lot safety.

FLEX-BEAM installation on Chicago's Calumet Skyway.

Armco Drainage & Metal Products, Inc.
Department E
5880 Curtis Street, Middletown, Ohio

Send my copy of the Armco FLEX-BEAM Guardrail Catalog

Name________________
Organization________________
Street________________
City________________ Zone________
State________________

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Concrete Engineering Company, Ltd., Prestressed Concrete I-Joists

Vladimir Ossipoff, Architect

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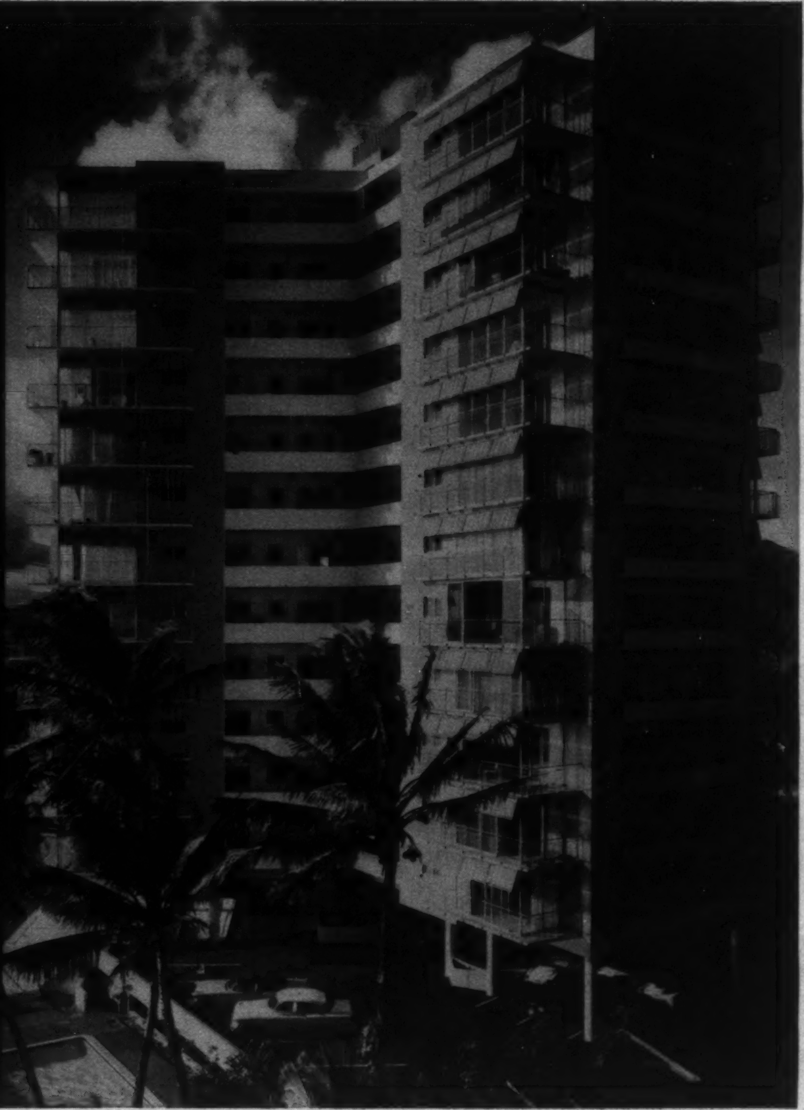
TYPICAL FRAMING,
DIAMOND HEAD APARTMENTS

Total Lineal Ft of I Joists 15,000'
6'-6" for 28'-0" Span
4'-6" for 40'-0" Span
Strands
9"



Prestressed Concrete Piles go way down to raise Hawaii's most beautiful apartments

The new, 12-story Diamond Head Apartments, built at a cost of more than $1,700,000, is a model of beauty, luxury and impressive construction methods.

The structure's seashore site — literally in the shadow of Diamond Head on the Island of Oahu—made for some difficulties during the foundation phase. The refusal depth of the prestressed concrete underpinnings in the unpredictable coral was unknown and could only be discovered by driving. One pile, in fact, broke through a coral shelf and sank out of sight. An excavation was dug until the top of the pile was recovered. Then dowel bars were placed in the top and an additional pile spliced on and driven to refusal — some 70 ft down.

The floor framing throughout is of precast, prestressed concrete I-joists, with poured-in-place slab, as shown in the drawing above. This type of economical framing is rapidly gaining in popularity. One main reason for its economy is that the spacing between joists can be arranged to take standard plywood form sheets, making for extreme simplicity of installation.

This luxury structure is an outstanding example of prestressed concrete's ever growing acceptance and its ready adaptability to *improvements in the method itself*. Pile splicing is a comparatively new technique that brings still further benefits to this remarkable, economical construction method. Ever-present are prestressed's inherent advantages; great strength, construction speed (members can be fabricated and trucked to the job site with great dispatch), insurance and maintenance benefits and wide design adaptability.

Roebling has long advocated the prestressed method and has manufactured highest quality stress-relieved prestressing strand for fabricators throughout the country. Our knowledge, data and experience, covering every phase of prestressed concrete, are at your disposal. We invite inquiries on whatever aspect may interest you. Write Roebling's Construction Materials Division, Trenton 2, N. J.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

Illinois to Test Low-Cost Roads

The University of Illinois is launching a five-year test program designed to simulate actual traffic testing of low-cost materials for secondary roads and city streets. Testing is expected to begin by September 1, according to Prof. George W. Hollon of the University's Department of Civil Engineering.

Industrial sources have pledged $13,200 a year for five years.

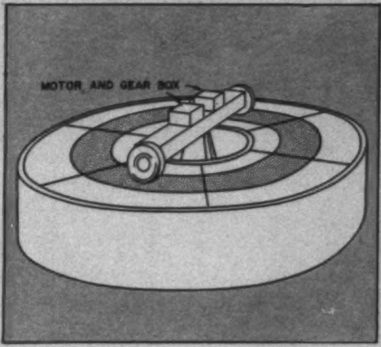
Tests will be conducted on a circular track 26 ft in diameter. They will be made with two truck wheels mounted at the ends of a beam pivoted in the middle of the test track. The wheels will travel at speeds from 3 to 25 mph under test loads of 1,700 to 3,000 lb per wheel.

The wheels will automatically move in and out, covering a path 2½ ft wide. Test operations will be run continuously except for a total of four hours per day for lubrication and adjustments.

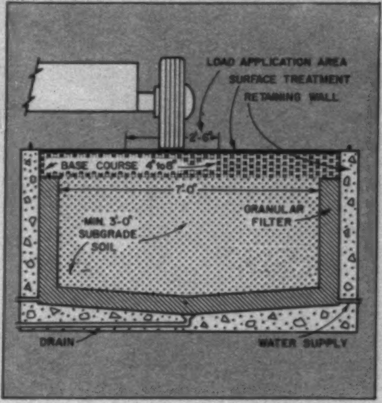
The 50 ft of test track will be divided into six segments. The subsoil will be the same under all segments, with the water content varying to simulate actual field conditions. One test section will be the Illinois State Highway Department's standard crushed stone base construction.

Other sections will provide basic information to set construction standards for low cost secondary roads using two relatively new materials. One is a slag, lime, fly-ash mixture on which Prof. Hollon has been doing research for four years. Currently it is being field tested on several secondary roads in northern Illinois by the Cook and Lake County Highway Departments.

The first three years of work will be devoted to this mixture. The next two years are scheduled for tests on the use of lime to stabilize roadways.



26-ft-dia track will hold . . .



. . . Various base materials.

Sponsors contributing to the research costs include the National Lime Association, Washington, D. C.; Pozzolan Products Co., and Marblehead Lime Co., both of Chicago; and G. and W. H. Corson Co., Philadelphia.

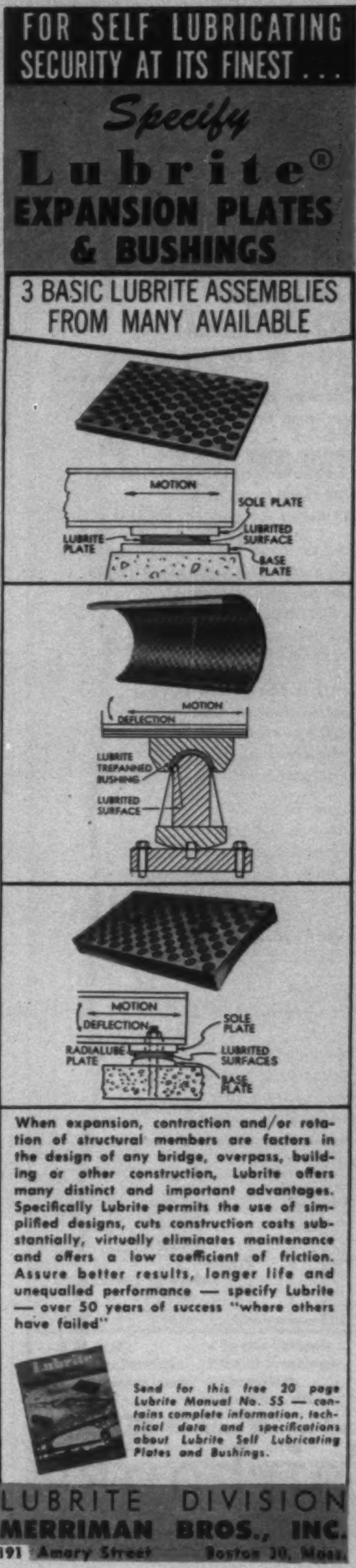
USBR Investigates Metal Coatings

In 11 years of testing protective coatings for metalwork exposed to the corrosive and abrasive forces of fresh water, air and various soils, the Bureau of Reclamation has found that:

- Coal tar enamels show up well in laboratory tests as coatings for continuously submerged iron and steel structures, such as water pipes, high-pressure gates of dams and intake trash racks.
- Vinyl resin paints are economical and effective on tank interiors and gates.
- Two types of vinyl paint, three types of phenolic paint, and coal tar enamel best withstood the abrasive action of the rushing water in penstocks in a long-term test at the Shasta power plant in California.

Cold-applied asphalt paint, neoprene, cement mortar, coal tar paint, and vinyl-resin paint best stood the extremes in a six-year exposure test performed on pipes with various interior coatings at Shadow Mountain Reservoir in the Rockies. Pipes were exposed to the frigid 40-deg-below air and then submerged in the reservoir in the summer.

A long-range test of a variety of interior protective linings for steel pipe is now under way in Colorado. Thirty-six different linings are installed in a 72-in. siphon going in service this year.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EXPANSION PLATES & BUSHINGS

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When expansion, contraction and/or rotation of structural members are factors in the design of any bridge, overpass, building or other construction, Lubrite offers many distinct and important advantages. Specifically Lubrite permits the use of simplified designs, cuts construction costs substantially, virtually eliminates maintenance and offers a low coefficient of friction. Assure better results, longer life and unequalled performance — specify Lubrite — over 50 years of success "where others have failed"

Send for this free 20 page Lubrite Manual No. 55 — contains complete information, technical data and specifications about Lubrite Self Lubricating Plates and Bushings.

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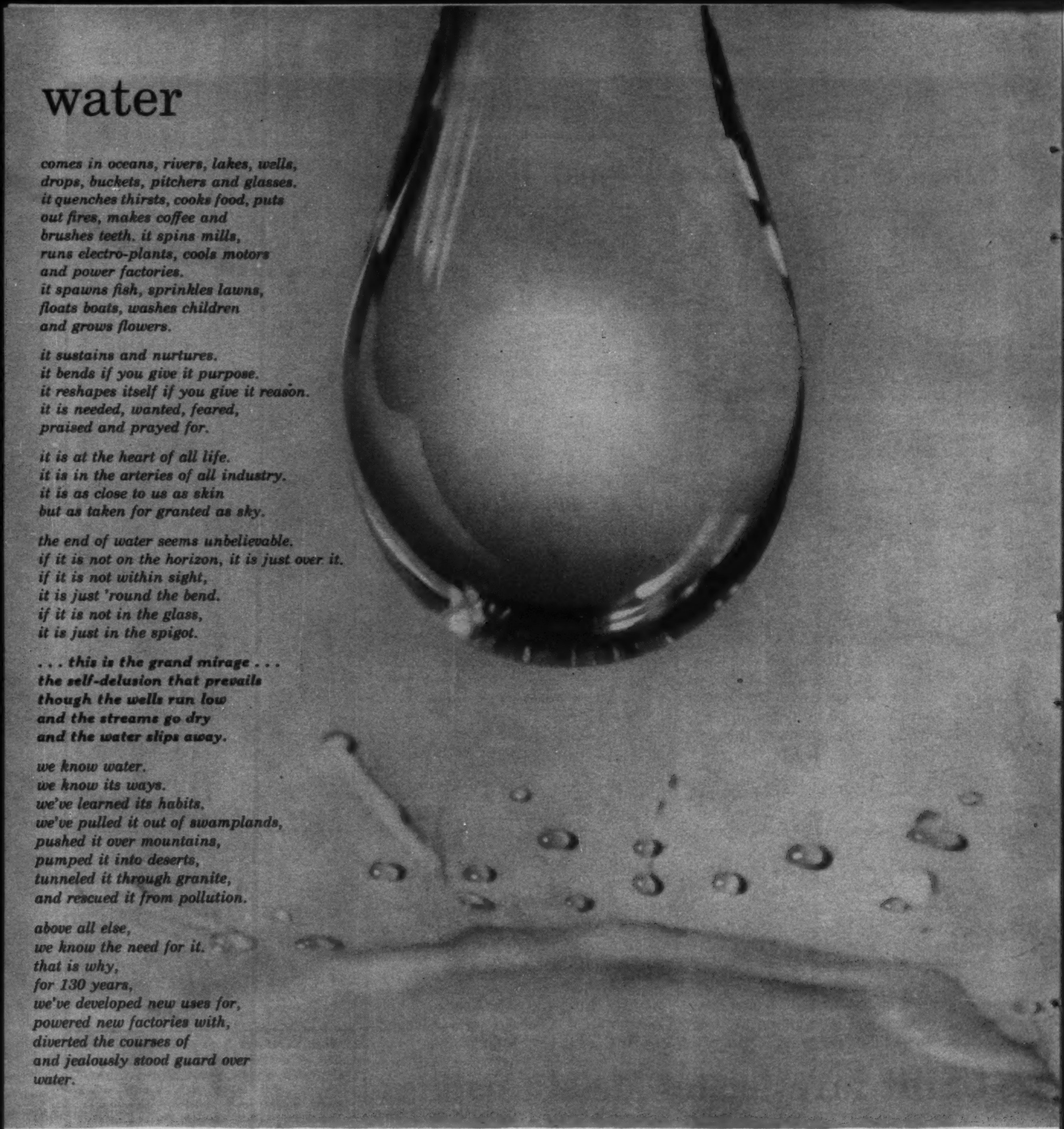
191 Amory Street Boston 30, Mass.


water

comes in oceans, rivers, lakes, wells,
drops, buckets, pitchers and glasses.
it quenches thirsts, cooks food, puts
out fires, makes coffee and
brushes teeth. it spins mills,
runs electro-plants, cools motors
and power factories.
it spawns fish, sprinkles lawns,
floats boats, washes children
and grows flowers.

it sustains and nurtures.
it bends if you give it purpose.
it reshapes itself if you give it reason.
it is needed, wanted, feared,
praised and prayed for.

it is at the heart of all life.
it is in the arteries of all industry.
it is as close to us as skin
but as taken for granted as sky.

the end of water seems unbelievable.
if it is not on the horizon, it is just over it.
if it is not within sight,
it is just 'round the bend.
if it is not in the glass,
it is just in the spigot.

. . . this is the grand mirage . . .
the self-delusion that prevails
though the wells run low
and the streams go dry
and the water slips away.

we know water.
we know its ways.
we've learned its habits.
we've pulled it out of swamplands,
pushed it over mountains,
pumped it into deserts,
tunneled it through granite,
and rescued it from pollution.

above all else,
we know the need for it.
that is why,
for 130 years,
we've developed new uses for,
powered new factories with,
diverted the courses of
and jealously stood guard over
water.

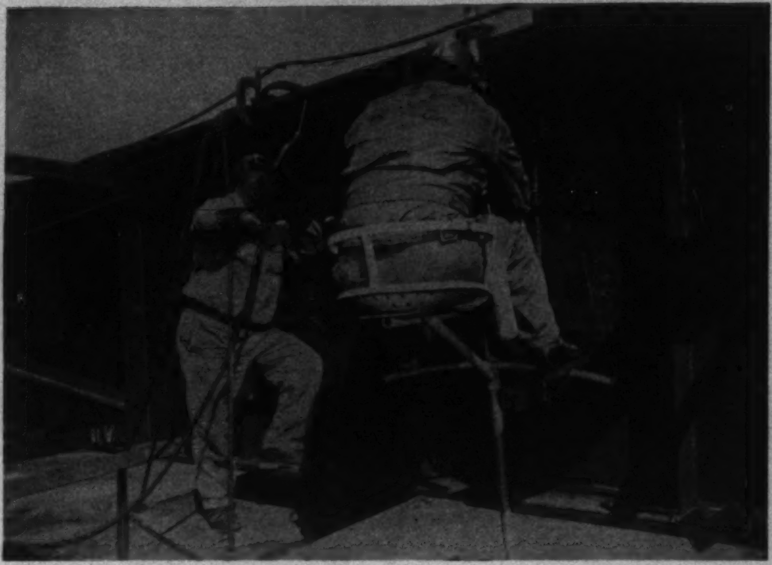
Fairbanks, Morse

A MAJOR INDUSTRIAL COMPONENT OF FAIRBANKS WHITNEY CORPORATION, NEW YORK

No other manufacturer makes pumps for such a variety of hydraulic applications as Fairbanks, Morse. If it's liquid . . . if it flows . . . we make the pumps that move it . . . at low cost per gallon . . . in sizes from 200 gph to 800,000 gpm, and to 3000 psi . . . for every industrial need.

Our pumps . . . our generators and controls . . . our new rotary compressors . . . our drive toward better ways to de-salt ocean water . . . the potential of our advance Research & Development Center in Beloit . . . our lead position in the field of Hydrodynamics . . . all of these equip us to serve you.

Send for our brochure—"Hydrodynamics." Please write to Mr. Robert W. Kerr, President, Fairbanks, Morse & Company, 600 South Michigan Ave., Chicago 5, Illinois.



Welcome Throne for Welders

A steel sulky seat for welders working on bridge girders and other overhead welding jobs has been designed to replace the old rope-hung wood platform. Weight of the entire assembly is only 45 lb.

The sulky seat is made of perforated pressed steel with a 9-in.-high circular steel strap rail. A steel bracket frames the seat to a tubular mast, which hangs from a bracket straddling the top flange of the girder.

The welder can adjust the level of the sulky seat by pinning a dowel through one of the holes punched at 12-in. spacing along the mast. Accessories include ladder rungs on the mast and a safety chain for added protection against falling.

Welded to the bracket strut at its junction with the mast is a curved footrest.

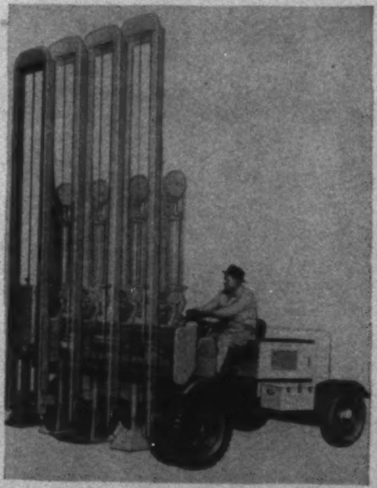
Other uses of the sulky seat include overhead painting, masonry repairs, and cleaning, according to the manufacturer. P. H. Malloc Co., Niles, Ohio.

Multiple Hammer Has Many Uses

A side-action mobile hydraulic hammer has 7-ft working width when leads are vertical—8 ft when angled.

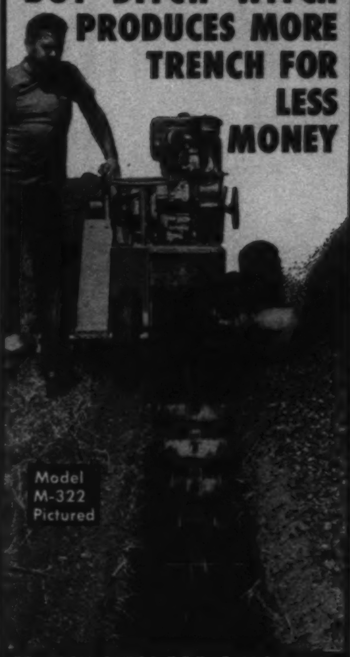
The machine is designed to work close to piers, abutments, footings, and similar structures. It can work from side to side across the front of the machine, either forward or reverse.

Control of the side action is hydraulic. Lift of the 1000-lb hammer weight can be controlled from inches up to 9 ft. Hammer stroke control can be set on automatic to deliver blows of uniform impact at a uniform rate, or the hammer can be controlled manually. Other hydraulic controls tilt the tower forward, backward or at an angle or fold it back, reducing the height of the machine from 13 ft 11 in. to 6 ft 10 in. for going through doorways or for travel on the highway.

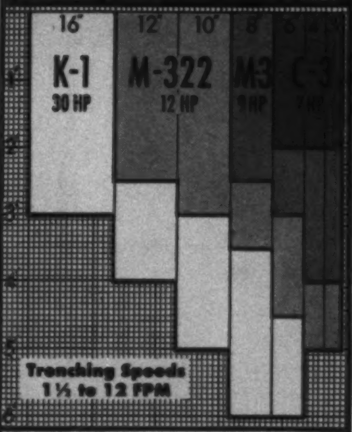


The unit can be driven at highway speeds up to 30 mph. Working speeds are variable up to 32 fpm, forward or reverse, through an hydraulically powered creeper gear. Arrow Manufacturing Co., 194 W. Dakota Ave., Denver 9, Colo.

"More or Less" THE BEST
DITCH WITCH TRENCHER
Other trenchers cost "More or Less"
Other trenchers dig "More or Less"
BUT DITCH WITCH PRODUCES MORE TRENCH FOR LESS MONEY



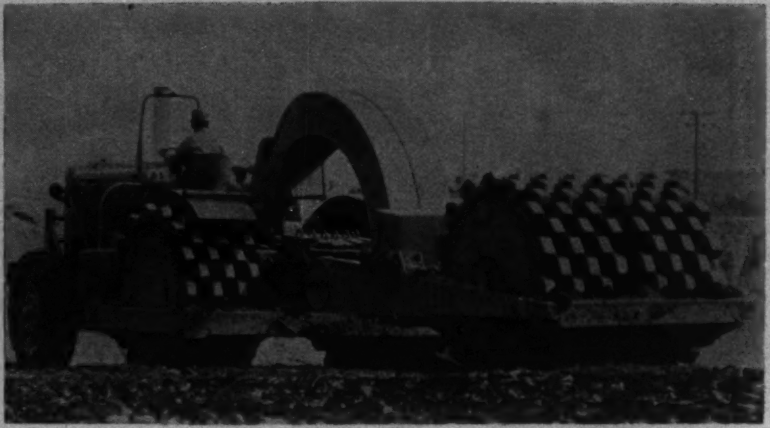
TRENCH SIZES FOR 4 MODELS:



USE FOR:
- Utility Services
- Gathering Lines
- Signal Lines
- Sewer Laterals
- Road Crossings
- Sprinklers
- Footings, etc.

CHARLES Machine Works, Inc.
640 Birch St. • Perry, Okla.

To Locate Distributor, Look Under "Contractors Equipment" in 1960 Metropolitan Telephone Directory Yellow Pages for Ditch Witch Trademark; or Call Collect FE 6-4404, Perry, Okla.



Compactor Works at High Speed

The DW20A Compactor is designed for high-production compaction in all classes of soil and rock fill material at speeds up to 15 mph. This high speed has made possible consistent production rates of 1,200 cu yds per hour, according to the manufacturer.

The DW20A is available with interchangeable tamping wheels or Hyster's "Grid" wheels. The machine operates as an integral part of the Caterpillar DW20 tractor. Rear tractor wheels are replaced with compacting wheels, and a gooseneck trailing roller contains two similar wheels. Combined coverage width is 10 ft. Existing tractor axles, brakes and bearings are used for the tractor compaction wheels.

A sloped-pad tamping foot is said to enable drive wheels to develop more tractive effort than with flat pads. The tamping compactor is most effective in plastic soils. Higher gradability can be obtained with the assistance of traction-aiding devices.

The "Grid" Compactor is basically the same unit equipped with open surface wheels of heat-treated, cast alloy steel construction. This unit is at its best in gravelly soil and rock.

A variety of ballast combinations may be applied to suit either compactor directly to the job. Recommended ballast is three 4,000-lb steel weights carried on the frame of the towed unit. Steel ballast of 5,000 lb is recommended for the tractor. Wet sand may be carried in the compaction wheels for additional weight. Ground reactions for the unit are in excess of 30,000 lb per set of wheels. Hyster Company, P. O. Box 328, Peoria, Ill.

Pull One Pin, Crane Folds Away

A truck and davit crane (Model H-550V) is arranged so that when mounted on a truck the boom can be folded down out of the way. Folding is accomplished by pulling one pin in the boom support.

The maximum lifting capacity of the crane is 1,500 lb with the boom retracted to its minimum reach of 39 in. With the boom extended to maximum 54 in. reach, lifting capacity is 1,000 lb.

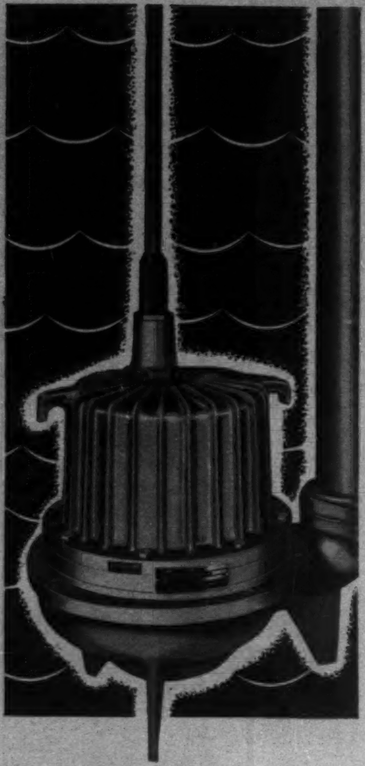
The unit has a large roller bearing at the top of the base and a ball thrust bearing at the bottom. The mast is ½-in. tubular steel. Boom and extension are made from rectangular steel tubing.

The crane is powered with a Model 44W heavy-duty double gear hand winch rated at 2,500-lb capacity. Lifting height from the floor is 7 ft 6 in. with the boom extended. Total height is 8 ft in this position. With the boom folded, height from the floor to top of winch is 51 in. Thern Machine Co., Winona, Minn.

Plastic Bar Supports Eliminate Rust Spots

Solid polythelene bolsters for reinforcing bars eliminate danger of rust spots from metal accessories on slab and beam soffits and column sides.

P-Kay Bolsters range in height from ½ in. to 1½ in. They will hold bars ranging from #3 to #9. Designed for use in slabs, beams and columns, the bolsters snap into place around the bars and hold them rigidly in place. Universal Builders Supply Co., Inc., 787 United Nations Plaza, New York 17, N. Y.

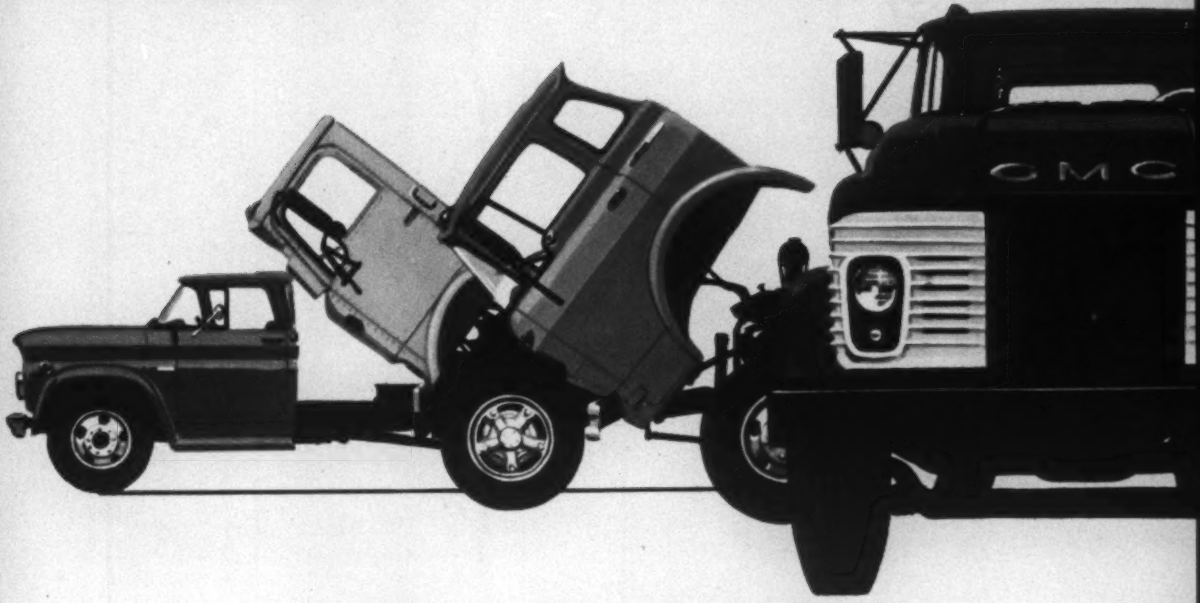


EFFICIENT,
SAFE
Weinman immersible non-clog pumps

You can't do better than Weinman Type M pumps for handling sewage, drainage water or industrial waste. They are quickly installed, no pit cover or special installation features required. Just lower pump into pit, connect discharge line and waterproof lead cable — it's ready to go to work. Ideal for portable or permanent installations.

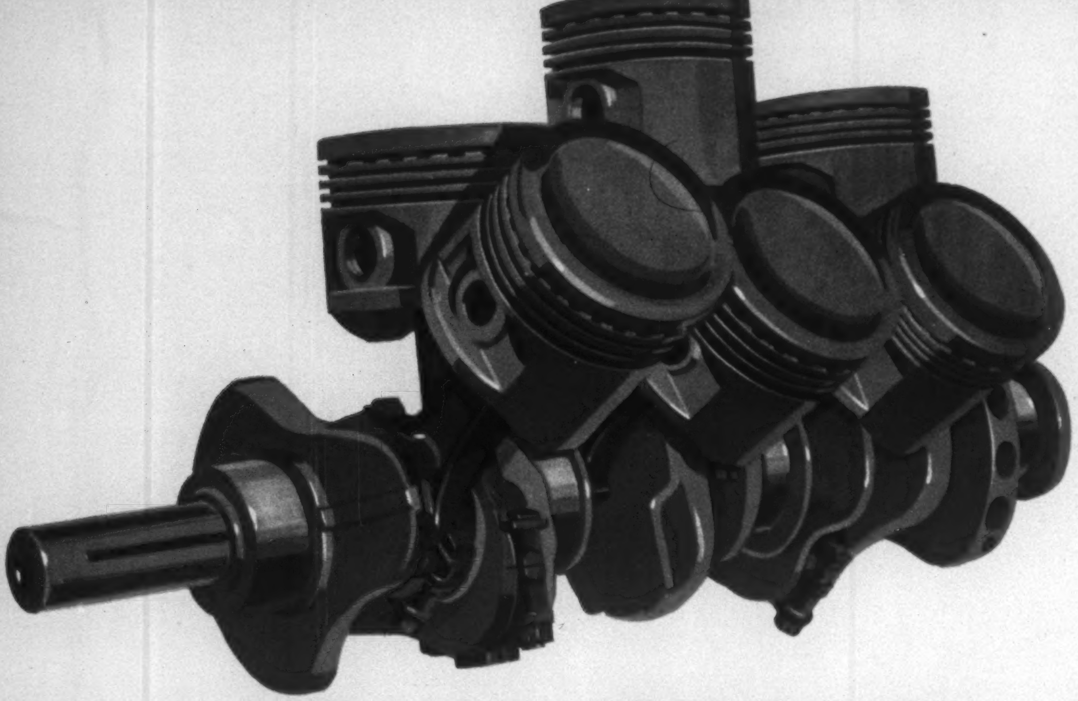
If you have a pumping problem, get in touch with your Weinman pump specialist. He's listed in the Yellow Pages of your telephone directory. Or, write us for Immersible Non-Clog Pump Bulletin No. 1700.

The WEINMAN PUMP Mfg. Co.
290 SPRUCE ST. COLUMBUS 15, OHIO
CENTRIFUGAL SPECIALISTS



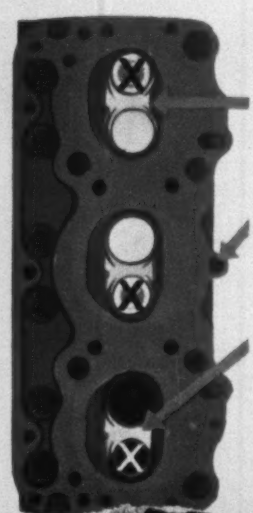
Here are the reasons why

GMC TRUCKS ARE CUTTING CONTRACTORS' COSTS ACROSS THE NATION!



CONTRACTORS FAVOR NEW EXTENDED-LIFE V-6 ENGINES!

Here's why—these exclusive, rugged engines produce full, usable torque at low, life-saving speeds . . . cut wear and increase fuel economy. Accurately controlled dynamometer and road tests indicate these advanced engines have a life potential of up to 200,000 miles of continuous operation without a major overhaul . . . with the proper maintenance and application.

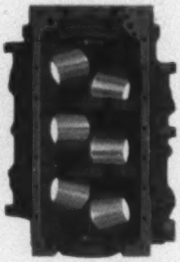


Completely machined combustion chambers assure equal displacement in each cylinder for smoothest power. There are no destructive "hot spots" due to uneven carbon build-up.

6 bolts around each cylinder (not 4) make a positive head-to-block seal and practically eliminate bore deflection.

Wide bridge (shown with valves removed): permits better cooling, up to 3 times more water circulation for faster heat transfer and greatly increased valve life.

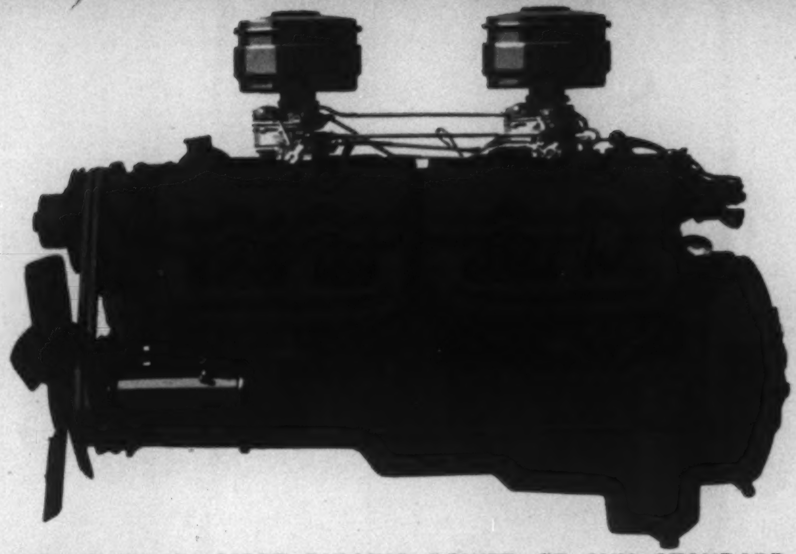
Note: No two exhaust valves **(X)** are adjacent. This prevents heat concentration and extends valve life.



High-strength, rigid engine block! New short V-6 block, extra strong inner ribbing, staggered cylinders, deep skirt 3" below crankshaft centerline—all give greater rigidity, add years of life to components.

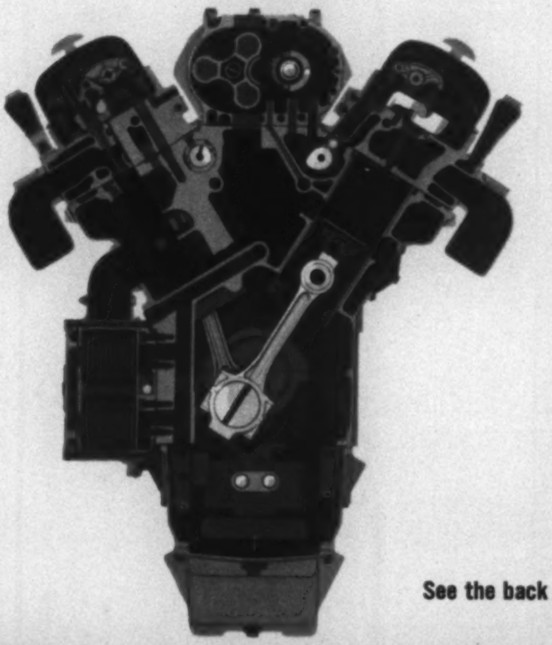
NEW GMC GAS ENGINES
PROFIT-PERFORMANCE ON EVERY HAUL

Model	Gross Torque Range	Max. Horsepower
305A	258-260 @ 1400-2200	150 @ 3600
305B	264-266 @ 1100-2000	150 @ 3600
305C	268-270 @ 1200-2100	165 @ 3800
351	308-312 @ 1400-2400	180 @ 3400
401	375-377 @ 1200-2000	205 @ 3200
702	625-630 @ 1400-2100	275 @ 2400



NEW TWIN-SIX MOST PULLING POWER OF ANY STANDARD GAS ENGINE! Now contractors are getting 625-630 pounds-feet torque over an extended 700 rpm range! This is all the working power and reserve power needed to get the biggest construction loads moving—and keep them rolling—with least gear shifting.

It has proved to be lasting power, too. Maximum governed engine speed is only 2400 rpm. This low-stress, easy-stroking speed greatly extends engine life, cuts operating costs to the bone.



NEW V-6 DIESELS MORE POWER PER DOLLAR! Proved, efficient 2-cycle design with power on every downstroke gives you more power per dollar, more power per pound, more power per cu. in. displacement! New 6V-71 engines have all the proved performance, economy and durability features of the famous 6-71SE Series, the power plants that have set new time-saving and money-saving records in hundreds of millions of miles of operation.

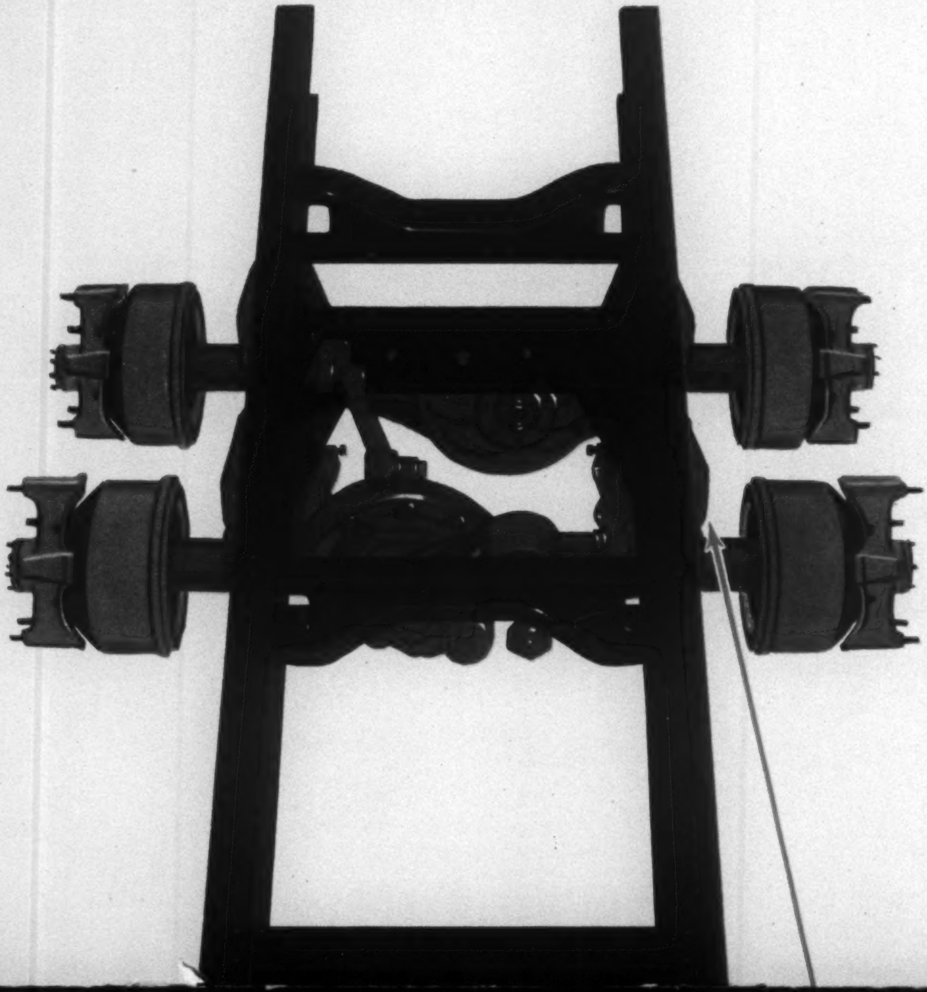
POWER-MATCH YOUR JOB WITH THESE NEW GMC DIESELS		
Model	Max. Torque	Max. Horsepower
6V-71	577 @ 1200	189 @ 1800 210 @ 2100*

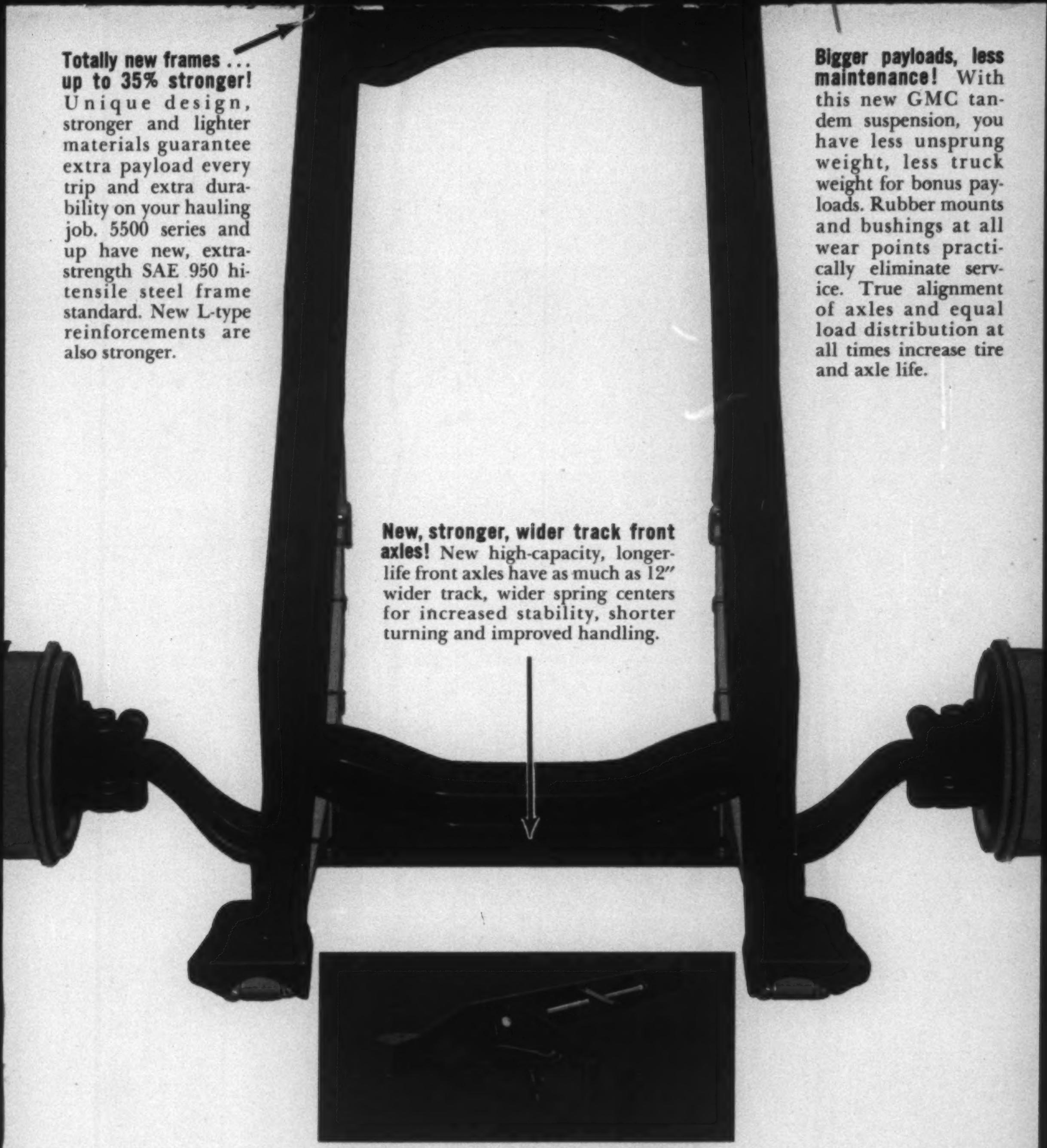
*No extra cost

See the back page for the most advanced trucks in 20 years!

NEW EXTENDED-LIFE ENGINES

New vari-rate rear suspension—standard equipment on 4-wheel models! You get longer life with GMC's new 3-inch-wide rear springs because they are under less stress. Braking and torque forces are directed to the frame by radius-rod leaf. New, progressive cam action adjusts to the load for an easier ride.





Totally new frames . . . up to 35% stronger! Unique design, stronger and lighter materials guarantee extra payload every trip and extra durability on your hauling job. 5500 series and up have new, extra-strength SAE 950 hi-tensile steel frame standard. New L-type reinforcements are also stronger.

Bigger payloads, less maintenance! With this new GMC tandem suspension, you have less unsprung weight, less truck weight for bonus payloads. Rubber mounts and bushings at all wear points practically eliminate service. True alignment of axles and equal load distribution at all times increase tire and axle life.

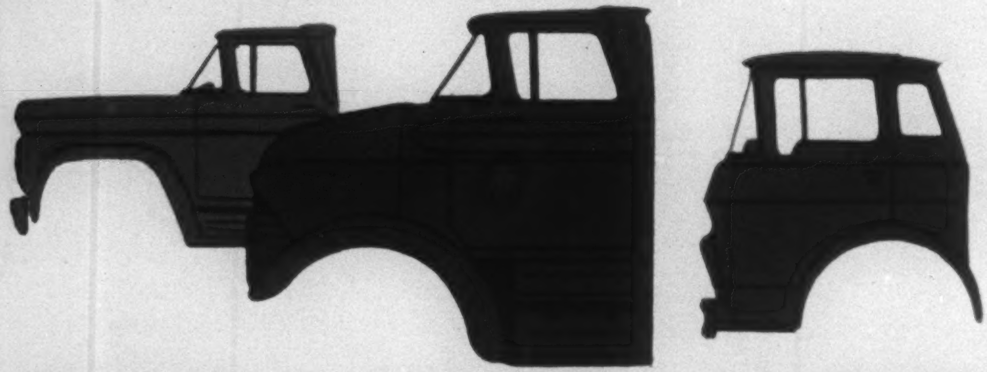
New, stronger, wider track front axles! New high-capacity, longer-life front axles have as much as 12″ wider track, wider spring centers for increased stability, shorter turning and improved handling.

Smoother ride, easier handling for 1960! With GMC's new independent front suspension, standard on 4-wheel models through 25,000 GVW, each wheel acts separately to better absorb shocks. You get increased road stability and reduced steering friction. Lighter-duty models have maintenance-free torsion bar springs standard.

See the back page for the most advanced trucks in 20 years!

NEW, STRONGER, MORE DURABLE CHASSIS

CABS FOR EVERY LOAD, ROAD AND LAW



CONVENTIONAL

Traditional standby for general all-round service. This year, the new GMC 105″ BBC cab has wider seats, more head and legroom inside, yet up to 10″ lower outside. Bigger windshield gives you more safety vision. New suspended pedals mean easier driving and better cab sealing.

CONVENTIONAL NINETY INCHER

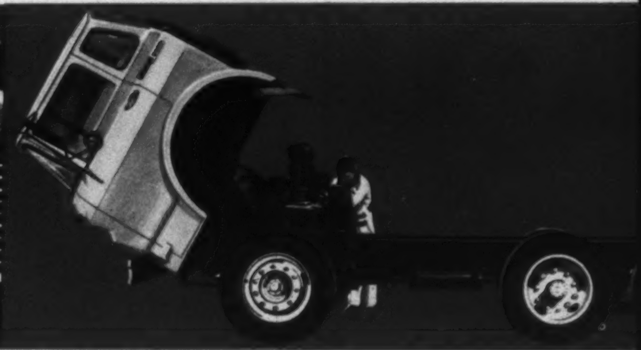
This is the increasingly popular new 90″ BBC conventional-type GMC cab . . . ideally built to mount big-payload dump bodies, flatbeds and all construction bodies. Greater front axle loading gives better weight distribution for bigger construction hauls.

STEEL TILT

With 72″ BBC and front axle set-back 52″, you have less over-all length and shorter wheelbases to mount longer bodies, haul longer trailers. More weight on the front axle means you can carry bigger payloads. Turning circles are shorter, too. Front vision is the best you can get.

QUICK, EASY SERVICING

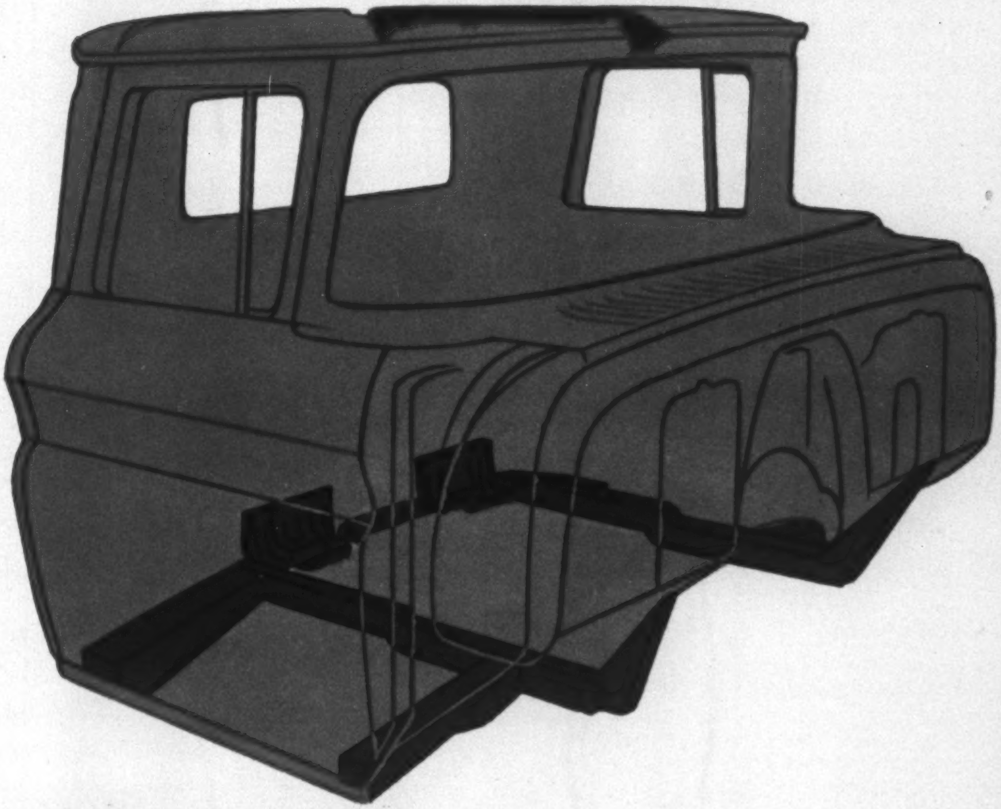
New GMC Conventional Nintey-Inchers speed maintenance and cut costs with the exclusive 3-piece side-opening hood and swing-out grille sections that expose the entire engine compartment.



Manually tilting of GMC's steel tilt-cabs is quick and easy with assist of torsion bar spring. Engine and all accessories are right out in the open for convenient servicing. Stationary island keeps controls in proper alignment and adjustment at all times.

DELUXE QUALITY IS STANDARD

For 1960, GMC is giving contractors all these extra-value features at no extra cost: foam-rubber seats, easily-removed instrument clusters for convenient servicing, steel-framed door windows to prevent chipping, rust inhibitor between door panels, and new 777 Super Enamel that keeps its luster longer, gives greater rust protection than previous finishes.



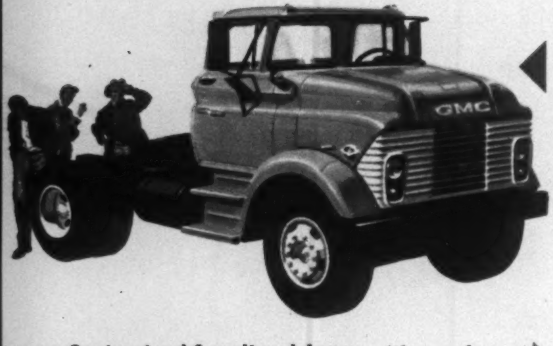
NEW, EXTRA-LIFE CABS

New GMC cabs will stand up for many years even on the most rugged hauls. This greatly extended on-the-job durability is the result of full double-wall construction, extra-heavy reinforcing inside the cab, and special, sturdy understructure—as shown above.

◀ **TEAR OUT HERE—See the back page for the most advanced trucks in 20 years!**

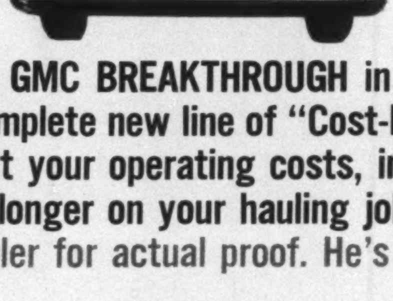
NEW, WIDE RANGE OF EXTRA-LIFE CABS

Highest performance of any gas-engine tilt-cab! This new GMC LW7000 Series is powered by the exclusive Twin-Six with 625-630 pounds-feet torque at 1400-2100 rpm. Easy-to-service, easy-to-drive steel tilt-cab trucks meet the hauling demands from 19,500 lbs. GVW to 76,000 lbs. GCW.



Increased front axle loading, bigger brakes, frames up to 35% stronger are just a few of the advantages contractors are getting with the industry's first and only full line of 90" BBC trucks. With choice of responsive, extended-life V-6 or Twin-Six gas engines and fuel-saving, high-performance V-6 diesels, you can power-match new Conventional Ninety-Inchers for every construction haul, 19,500 lbs. GVW to 120,000 lbs. GCW.

Contractors' favorite pickups—with good reasons. Only new GMC pickups have more durable cabs; new smoother-riding independent front suspension, exclusive new V-6 power. You can choose from 34 combinations, including rugged 4-wheel drive models.



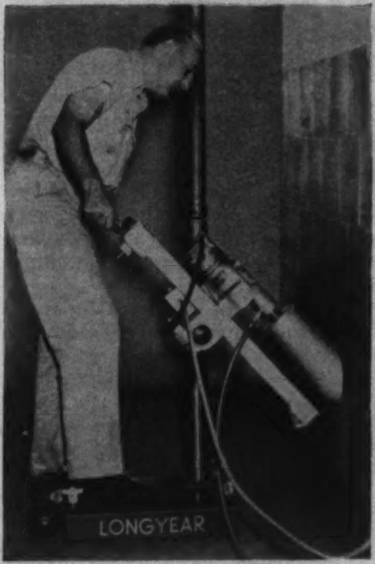
GMC
GENERAL MOTORS CORPORATION
TRUCKS

From ½-ton to 60-ton . . .
General Motors leads the way!

New from the BIG GMC BREAKTHROUGH in truck engineering...a complete new line of "Cost-Busters" that drastically cut your operating costs, increase payloads and last longer on your hauling job.

See your GMC Dealer for actual proof. He's listed in the Yellow Pages.

GMC Truck & Coach—a General Motors Division—Pontiac, Michigan



Versatile Diamond Drill Bores Hole at Any Angle

The Longyear "330", a 6-in. dia capacity diamond drill, bores holes at variable angles through reinforced concrete, stone, brick and other masonry materials. Powered either by compressed air or an electric motor, the drill swivels about two axes and adjusts vertically on a supporting post.

Air motors, operating at 90 psi pressure, 60 cfm, and 350-1500 rpm are interchangeable with 110-volt electric motors, operating at 350-1000 rpm. Air-powered units were designed for construction jobs where compressed air is the main source of tool power.

Another model, Longyear "305" is a lightweight vertical-hole drill, also of 6-in. dia capacity. It can drill horizontal holes when a screw-feed mechanism is anchored to the wall. E. J. LONGYEAR CO., 76 S. 8TH ST., MINNEAPOLIS 20, MINN.

Vibrating Screed Can Be Set to Walk Along Slab

A double-flanged steel screed, electric- or gasoline-powered, is designed to level concrete of precast concrete beams and sidewalk slabs.

Main feature of the screed is its adjustable vibration amplitude. It can be set to walk along the concrete surface. The front-running angle flange strikes off the excess concrete and the following flange removes air bubbles.

The Double Flange Screed is available in lengths ranging from 4 to 12 ft. Weight of the 4-ft model is 145 lb. STOW MANUFACTURING CO., 443 STATE ST., BINGHAMTON, N. Y.

New • Rugged ELECTRIC VIBRATOR

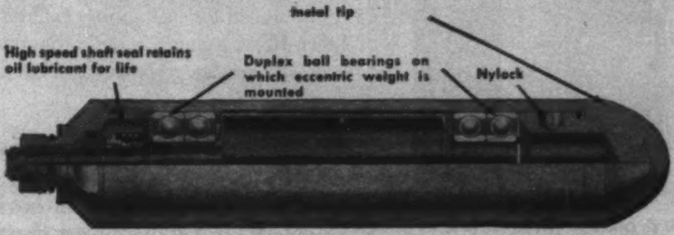
DELIVERS 9000 VPM AT 2 HP

UL approved

This new electric concrete vibrator, developed by STOW MANUFACTURING COMPANY, Binghamton, N. Y., features a new lightweight vibrator head that delivers, at high amplitude, 9000 vibrations per minute to the mix.

This vibrator, STOW model BU, is powered by a totally enclosed 2 HP Universal motor, operating on 115 volts, AC or DC, 25 to 60 cycles. The motor is protected by a skid mounting, so arranged that the unit can be easily pulled around by the flexible shaft.

Take a look at this vibrator head. It is 10 inches long, and available in diameters of 1⅞, 2 and 2¼ inches, capable of 9000 VPM. Vibrations are achieved by use of an eccentric weight mounted in special high speed duplux ball bearings at each end. The outside of the head is case hardened, for extra long wear, and it has a replaceable steel tool tip. STOW estimates that these two improvements alone will double the life of the heads.


metal tip
High speed shaft seal retains oil lubricant for life
Duplex ball bearings on which eccentric weight is mounted
Nylock

Construction men report that they like the light weight, the long life, the low replacement cost, and the terrific wallop of these heads. Weight of the 1⅞" head is about 5 lbs.; the 2" head about 7½ lbs.; the 2¼" head, about 9 lbs. The cost of this head is less than 1/3 the cost of expensive motor-built-in type heads.

The 1⅞" head is also available with a hard rubber tip for use where plywood forms are being used.

For more information about the complete line of STOW concrete electric and gasoline vibrators, vibrating screeds and rotary trowels, contact your STOW distributor, or write for STOW catalog 580.

STOW MANUFACTURING CO.
19 Shear St., Binghamton, New York

STOW MANUFACTURING CO.
Dept. C-4, 19 Shear St., Binghamton, N. Y.

Please send me Catalog 580 on Stow's line of Construction Equipment.

Name ....
Address .... City .... State ....

NOW! GET FULL-POWER FIRE FIGHTING WITH KIDDE'S DRY CHEMICAL LINE!

2½ and 5 pound pressurized units! Granted top rating by U.L., these two units pack the extra punch needed to get the jump on fire. For example, the 2½ pound Kidde unit is as compact as a 1 quart carbon tet model, yet is eight times as powerful! Both the 2½ and 5 feature simple, two-step operation, easy-to-read dust-and-moisture-proof gauges. 10 pound dry chemical also available.

20 and 30 pound pressurized dry chemicals! Both these Kidde units have the same good features of the 2½ and 5, plus some "extras" all their own. Center balanced for fast action, rugged diffuser horn, speedy trigger operation, recessed pressure gauge and enclosed mechanism.

200 pound dry chemical wheeled unit! Kidde's 200 pounder discharges a 40-foot stream faster, has an *extra* 50 pounds of fire-smothering dry chemical to knock down fire quicker. Low center of gravity and wide wheels make it easy to maneuver. Easy-to-use discharge control makes operation simple.

400 pound stationary unit! Here's maximum protection in a minimum package! Like all Kidde units, this features sure, dependable performance and fast, easy operation. Either wall-mounted or free standing, leakproof and tamperproof, exclusive Bridgeman Seal, universal long-range nozzle, easy-to-read pressure gauge. 200 pound model also available.

Get the jump on oil, gas and electrical fires! Learn more about the complete line of dependable, efficient Kidde equipment—write today!

Kidde

Industrial and Marine Division
Walter Kidde & Company, Inc.
444 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal—Toronto—Vancouver

Power-Controlled Winch For Cat D8; D9 Tractors

A power-controlled towing winch is available for installation on Caterpillar D8 and D9 tractors. The winch features a hydraulic control system.

A gear-type hydraulic pump is driven by the tractor lay shaft. The winch transmission oil is used in the control system, actuating a pair of multiple-disc, oil-cooled clutch units.

No adjustment is required during the life of the clutch units. The differential brake is a self-energizing type, which requires infrequent adjustment.

The power-controlled winch can be operated any time the tractor engine is running, independent of tractor clutch, allowing winching while the tractor is moving. The Hyster D89A Lo-Speed towing winch is available for jobs requiring high-line pulls and low-line speeds. Optional equipment includes cable guide rolls and a fair lead assembly and choice of standard, fixed or swiveling drawbar. HYSTER CO., P. O. Box 328, PEORIA, ILL.

Two V-8 Diesel Engines Designed for Heavy Duty

Two V-type, eight-cylinder diesel engines have 950 cu in. piston displacement. One engine is a 350 hp, naturally aspirated, model V8-350, designed specifically for construction machinery and heavy-duty haulage both on and off the highway.

The other engine, model VT8-430, is turbocharged to develop 430 hp. It represents the most advanced engine in its horsepower class today in ruggedness, size, weight and low cost, according to the manufacturer. Both engines operate at a maximum speed of 2,500 rpm.

Both are four cycle engines. The V8-350 weighs 2,940 lb; the other, 2,970 lb. CUMMINS ENGINE CO., INC., COLUMBUS, IND.

Plastic Welder Features New Heating Element

The #10-10 utility plastic welding torch has a 350-watt, 110-volt heating element that attains high temperatures rapidly. It will not burn out under exposure of heat without a normal cooling air flow, the manufacturer says.

Made of heavy-duty stainless steel, the #10-10 has a glass fiber handle. The torch can weld and repair most modern structural plastics—e.g., polyvinyl chloride, polyethylene and polypropylene. LARAMY PRODUCTS CO., COHASSET, MASS.

SELECT CONCRETE SHORING for Job-Efficiency and PROFIT . . .

If you're looking for cost-cutting construction methods, and who isn't these days . . . A. S. Horner Construction Co. of Denver has first-hand knowledge that SHORING and SAVINGS are synonymous terms when ADVANCE tubular steel Scaffold is on-the-job. Prior to undertaking construction of a new vehicular bridge at Fort Morgan, Colorado, Horner compared various methods for concrete shoring . . . then selected ADVANCE to do the job. Among other things, they found that the ADVANCE Shoring System combines maximum stability and leg-load capacity with the easiest, fastest assembly possible. All components of ADVANCE Scaffold (panels, braces and accessories) have self-contained locking mechanisms that speed scaffold assembly without tools, eliminate the expense of replacing lost parts. Result? Horner had the safest, most positive and least costly shoring system yet devised.

Horner's favorable experience with ADVANCE Shoring Scaffold has long been standard procedure with hundreds of satisfied contractor-users throughout the nation. By matching the right equipment to the job, they cut construction costs . . . stabilize their profit picture. You can too!

Your BEAVER-ADVANCE distributor has a large warehouse stock of both Standard and Heavy-Duty ADVANCE tubular scaffold for sale and rental. Contact him for full details on its use for concrete shoring, masonry, painting and all other building construction and renovation work. Scaffold engineering plans and estimates are gladly furnished without cost or obligation.

BEAVER ADVANCE

BEAVER-ADVANCE
CORPORATION

ELLWOOD CITY, PENNSYLVANIA

QUALITY
VALUE
SERVICE

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- ☐ Bul. 69.......Building with ADVANCE Scaffold
- ☐ Bul. 72.......Concrete Hoisting Equipment
- ☐ Bul. 73.......10M Heavy-Duty Scaffold

Name __________

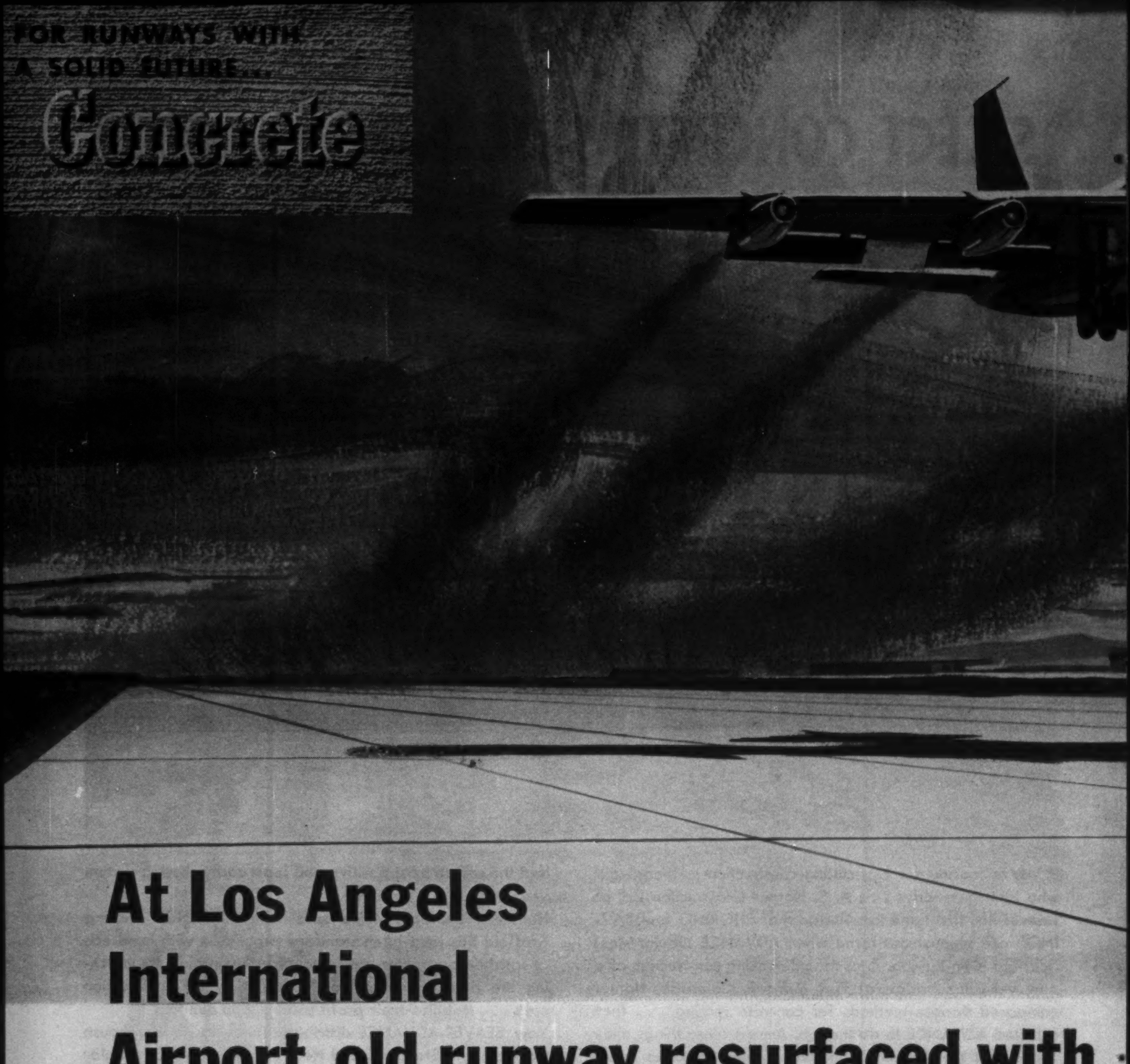
Company __________

Address __________

City __________ Zone _____ State __________

FOR RUNWAYS WITH A SOLID FUTURE...

Concrete



At Los Angeles International Airport, old runway resurfaced with

Los Angeles gets ready for jets

Above. Artist's sketch shows how airport will look with modern concrete runways and new futuristic-styled terminal area.

Right. Photo shows modern equipment now placing new concrete directly on the old flexible pavement of runway 25L. They're paving 1,600 feet of 25-ft. strips every working day, will take just 120 days for the whole runway—6,150 feet long by 150 feet wide!

CONCRETE makes 150-ton jets feel right at home!

A 12-inch overlay of concrete provides needed strength to handle the heaviest jet wheel loads ever expected. Concrete is the only true jet-age pavement. On runways *built specifically for jets* concrete has been the overwhelming choice.

And in reconstruction, where the old flexible pavement can still serve as a subbase, covering it with minimum-thickness concrete gives big savings.

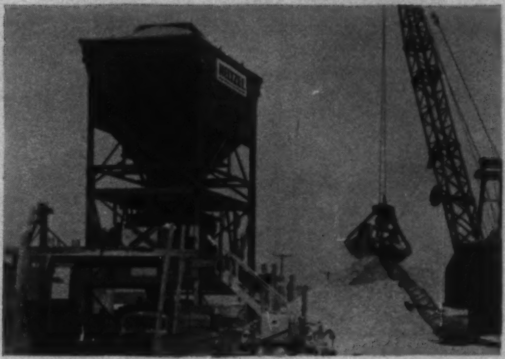
Such overlays are possible because concrete is *not flexible*. The strength is in the concrete itself—and not in built-up, layer construction. Concrete is more than a *smoothing* overlay. It's the one pavement with beam strength that enables engineers to compute loads mathematically, design runways for an expected life of *50 years and longer!*

And hot jet blasts can't melt concrete or chew it up. Spilled fuels do no damage, either. Light-colored concrete with its natural grainy surface is the high safety pavement, too. You get better visibility at night and dependable skid resistance whatever the weather.

These are all good reasons, too, why concrete is the preferred pavement for heavy-duty highways—such as those being built for the new Interstate System.

PORTLAND CEMENT ASSOCIATION *A national organization to improve and extend the uses of concrete*

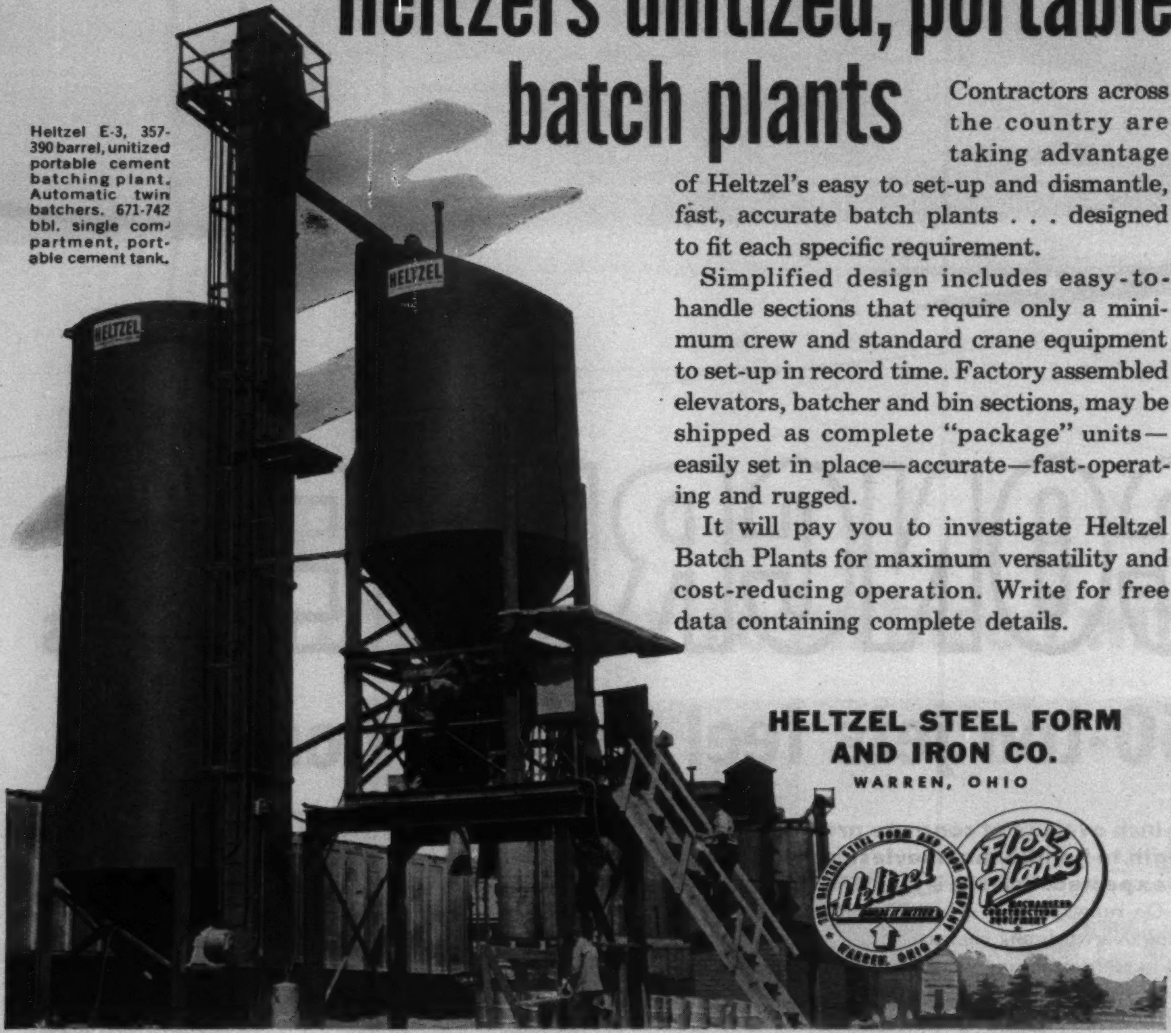
Heltzel 150 ton, 3 compartment, unitized type 200 aggregate bin. Three, 50 ton compartments. Twin, 1½ yard automatic batchers.



In South Carolina, too . . .

the move is to Heltzel's unitized, portable batch plants

Heltzel E-3, 357-390 barrel, unitized portable cement batching plant. Automatic twin batchers. 671-742 bbl. single compartment, portable cement tank.



Contractors across the country are taking advantage of Heltzel's easy to set-up and dismantle, fast, accurate batch plants . . . designed to fit each specific requirement.

Simplified design includes easy-to-handle sections that require only a minimum crew and standard crane equipment to set-up in record time. Factory assembled elevators, batcher and bin sections, may be shipped as complete "package" units—easily set in place—accurate—fast-operating and rugged.

It will pay you to investigate Heltzel Batch Plants for maximum versatility and cost-reducing operation. Write for free data containing complete details.

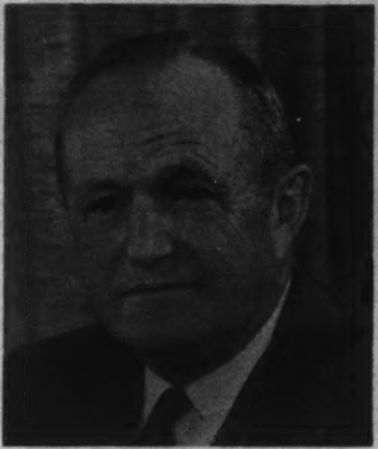
HELTZEL STEEL FORM AND IRON CO.
WARREN, OHIO

Norman Mason Honored by BRI

Norman P. Mason, U. S. Housing Administrator, is the first recipient of the F. Stuart Fitzpatrick Memorial Award for outstanding achievement in the unification of the building industry.

Mr. Mason received a scroll and commemorative silver medal at a luncheon April 6 at the Building Research Institute's spring conference in New York City.

Mr. Fitzpatrick, who died in 1956, was manager of the construction and civic development department of the U. S. Chamber of Commerce for 25 years. The award created in his honor was established through the donations of more than 100 building industry associations to acknowledge the perpetual debt the industry owes to his memory.



Norman P. Mason

Careers

Business

Robert W. Shaffer has joined Wilsey & Ham, engineers and planners, Los Angeles. For the past 16 years Mr Shaffer has directed hydrographic studies on the Rio Grande River and dam investigations and design. He also served as public works officer for the U. S. Naval stations and coordinated development of a solid fuel rocket production plant.

E. R. Evans has been elected vice president in charge of sales of Vulcan Iron Works Inc., Chicago.

M. D. Ayers has been named director of engineering of the Kennecott Copper Corp. He joined the company in 1956 as assistant to the president. Before that he was chief engineer of the Wheeling Steel Corp.

F. A. Davidson Jr. has been elected president of Chesebro-Whitman Co., scaffolding and shoring contractors, New York City. He was with Eggers & Higgins, New York City architects, as chief of construction and administrative engineering. Mr. Davidson succeeds **Clifford R. Faulkner,** who joins Minor Lumber and Building Supplies, New Haven, Conn.

Edward J. Logue is Boston's new development administrator after serving as director of New Haven, Conn. renewal program. In his new post Mr. Logue directs all renewal projects and coordinates activities of the City Planning Board, the Boston Redevelopment Authority and all other development agencies.

T. C. Oxman has been named a director of the Mannix Co., Ltd., Calgary, Alberta contractors. He is also vice president of operations and directs all field work. He has been manager of the Mannix Highway Division.

William J. Chase, chief design engineer for Hill & Ingman, consulting engineers of Seattle, has been promoted to a junior partnership.

W. E. Dreusike is assistant vice president of Pacific Iron & Steel Corp. in San Francisco. He had been with Judson-Pacific Murphy Corp. and worked on the Richmond-San Rafael Bridge.

Jack D. Goodrich has been named chief engineer of Dundee, Inc., Wilmington, Del. He had worked with United Engineers and Construction, Inc. as job engineer during the construction of the Enrico Fermi Atomic Power Plant near Monroe, Mich.

Edward J. Sohn has been appointed vice president and general manager of Yuba Bedford Corp., a subsidiary of Yuba Consolidated Industries, Inc., Bedford, Ind.

C. L. Shimek and **George M. Parker Jr.** are the newly elected vice presidents of Forrest & Cotton, Inc., Dallas consulting engineers.

Raymond J. Hodge is now manager for Knappen-Tippetts-Abbett-McCarthy in El Salvador. Since 1956, Mr. Hodge has been project manager for the company in Thailand, directing a $55 million program for construction of airports, ports and other works.

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The FINEST in SURVEYING EQUIPMENT

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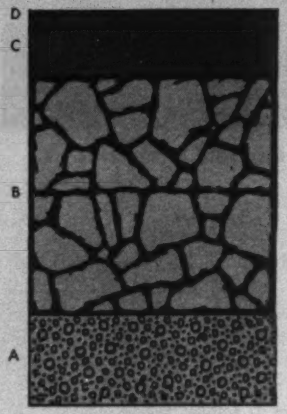
120 Grand St., White Plains, N.Y.

Specify Laykold Mastics
For Heavy Duty Floors:
Military Depots • Gymnasiums
Warehouses • Loading Platforms
Parking Garages • Exhibit Halls



Cross-section View of a Typical On-grade Laykold Mastic Floor

A—2" sub-base of compacted crushed gravel.
B—5" of Bitumuls Penetration Macadam placed in two lifts.
C—2" of Laykold Mastic placed as 1½" leveling course; ½" surface course.
D—Wearcoat Finish; Colorcoat Seal (choice of colors: red, green, black).

Heavy Duty Floor Mastics are made of Laykold Floor Mastic Binder, cement, sand, and stone chips. These are easily mixed and screeded into place; hard-trowelled to a dense, smooth surface; and cured to a hard, durable finish.

"Bonus Benefits" of Laykold Mastic Floors:

- No dust or spalling normally associated with concrete
- Resilient, warm, water-resistant, and easy on the feet
- Easy to maintain and repair

For on-grade construction Laykold Mastic Floors are often "built from the ground up". One recent example: the Field House floor specified and built for the Waukesha, Wisconsin, High School, shown above.

This floor, Bitumuls Penetration Macadam construction, has a Laykold Mastic surface, Wearcoat finish, and a "two-tone" Colorcoat seal (in green and red). They use it for a full program of athletics; plus auto, stock, and home shows.

Laykold Mastics are also used to surface concrete floors and as underlayments for floor tile.

There's a Laykold Mastic Floor to meet industrial, commercial or institutional needs. Call us for "typical specs".

American Bitumuls & Asphalt Company

320 MARKET, SAN FRANCISCO 20, CALIF.
Perth Amboy, N. J.
Baltimore 3, Md.
Cincinnati 38, Ohio
Atlanta 8, Ga.
Mobile, Ala.
St. Louis 17, Mo.
Tucson, Ariz.
Portland 8, Ore.
Oakland 1, Calif.
Inglewood, Calif.
San Juan 23, P. R.

BITUMULS® Emulsified Asphalts • CHEVRON® Paving Asphalts • LAYKOLD® Asphalt Specialties • PETROLASTIC® Industrial Asphalts

Thomas R. Leach and **John R. Booton** are the new partners in Wiley and Wilson, consulting engineers of Richmond and Lynchburg, Va.

New President of Lardner & Wich, Inc. is **John F. Wich,** executive vice president since 1952. **J. Gordon Mueller, Frederick W. Mueller** and **Emory S. Miller** are the newly elected vice presidents.

James C. Ryan takes on a new position as an associate of Theodore Dastoli & Associates of Youngstown, Ohio after serving for 16 years as commissioner of engineering in Youngstown.

Retirements

Andrew R. LeBailly, partner and chief engineer of Sargent & Lundy, Chicago consulting engineers, has retired. He joined the firm 32 years ago, was admitted to partnership in 1948 and served as chief engineer since 1954. Replacing him as chief engineer is **Henry C. Schroeder. Harry H. McMeen** moves up into Mr. Schroeder's former position of chief mechanical engineer.

A. V. Williamson has retired as staff maintenance engineer for the Colorado Highway Dept. Before coming to the Colorado Highways, he was division engineer at Denver for the Bureau of Public Roads.

Chester M. Hinds has retired as Boston district engineer at Bethlehem Steel Co. He took over the District in 1936 after directing the Boston area for Kalmen Steel Co.

B. B. Talley, retired Brigadier general, has resigned as vice president of Raymond International Inc., to engage in private business in Mangum, Oklahoma.

Charles E. Slusser has resigned as public housing commissioner to return to private business in Akron, Ohio. Mr. Slusser, who was at one time mayor of Akron, served as housing commissioner for six years.

Education

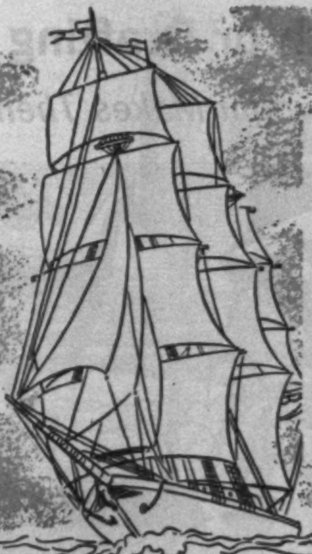
Werner N. Grune has been promoted to a full professor of civil engineering at the Georgia Institute of Technology. Mr. Grune, who came to the institute in 1952, teaches sanitary engineering, and is active in studying disposal of atomic energy wastes.

John R. Whinnery, professor of electrical engineering, has been appointed dean of the College of Engineering at the University of California at Berkeley. He has been chairman of the electrical engineering department since 1956.

(Continued p. 100)

Why Rust-Oleum is different-

and how this difference helps to keep your equipment looking in top shape against rain, sun, heat, fumes, and weathering!



A Sea Captain developed it . . . Industry proved it!

The original Rust-Oleum formula was developed nearly fifty years ago by Sea Captain Robert Fergusson, who became intrigued with the rust-stopping qualities of fish oil early in his career. Creating a special treatment for the fish oil, he used the specially-processed fish oil as the vehicle in combination with fine rust-inhibiting pigments. The result? A coating that actually *stopped rust* when applied directly over sound rusted surfaces, after scraping and wirebrushing to remove rust scale and loose rust. Possible, because the *specially-processed* fish oil penetrated the rust to bare metal. This was the birth of Rust-Oleum's exclusive 769 Damp-Proof Red Primer.

RUST-OLEUM NEW COLOR HORIZONS SYSTEM AND SPEEDY-DRY COATING SYSTEM

Included in the Rust-Oleum New Color Horizons System of primer and high gloss top coats are colors to match your original equipment color! This system combines four important factors: (1) The ability to stop rust, (2) beautify as you protect with colors that match your original equipment, (3) durability to last and last, (4) ease of application by spray or brush.

Where unusually fast drying time (dry to touch in less than 30 minutes) is required for production or maintenance finishes, the Rust-Oleum Speedy-Dry System of primers and high gloss top coats will do the job. Send the coupon today, or contact your nearby Rust-Oleum Industrial Distributor.

RUST-OLEUM.®

RUST-OLEUM
STOPS RUST

There are imitations,
but only *one* Rust-Oleum.
It is distinctive as
your own fingerprint.

STOPS RUST!®

ATTACH TO YOUR LETTERHEAD

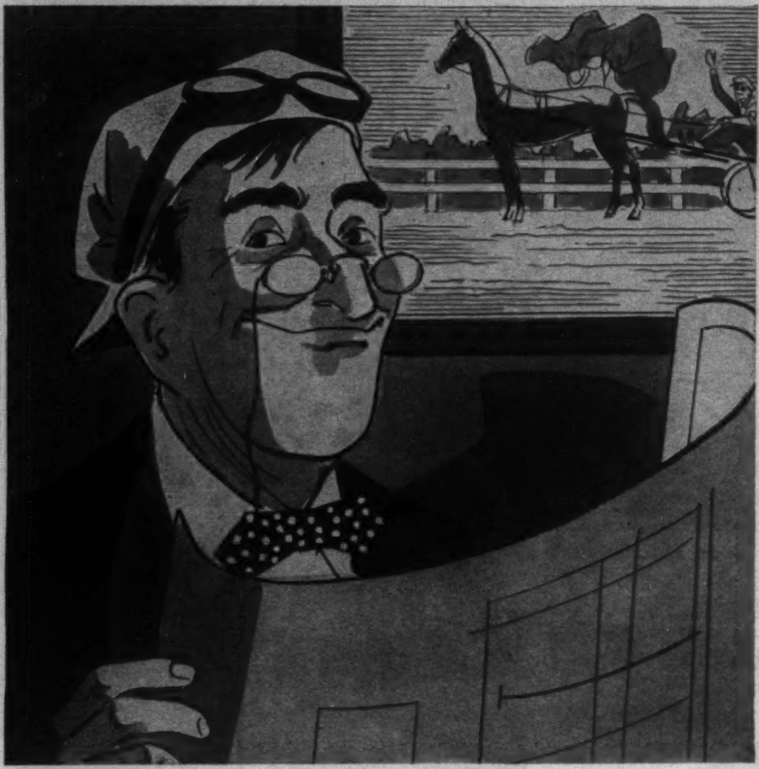
Rust-Oleum Corporation
2544 Oakton Street, Evanston, Illinois

Please send me the following at no cost or obligation:

- ☐ **New Color Horizons Catalog—38 pages including actual color standards on colors to match original equipment finishes.**
- ☐ **Free test sample of Rust-Oleum 769 Damp-Proof Red Primer to apply over sound rusted surface.**
- ☐ **Nearest Rust-Oleum Industrial Distributor.**

Tracing Cloth or Drafting Film*?

Arkwright Makes Them Both



*Based on DuPont "MYLAR" polyester film.

CHESLEY RIDEOUT
CANTOR, GALLUP AND RIDEOUT
OLD EASTBURY, N. Y.
ARCHITECT

On being interviewed as to where his firm intended to lay out the new spectacular trotting track, Ches commented:

"On Arkwright naturally. Whether it will be on cloth or film is just a matter of personal preference. But . . . this new ultra modern track with the grandstand moving around with the horses will be a prototype for all future tracks. Over the years, this master plan will be referred to many times. Besides keeping clear and sharp and resisting discoloration, it must have long life and resistance to wear and tear. I don't want to be known as Rip Rideout, the man who laid out Old Eastbury on tissue. Well . . . see you in the winner's circle with Arkwright."

For perfect performance on cloth, specify the roll with the Blue Line — Arkwright. See for yourself the advantages of Arkwright's perfect coated surface on drafting film. Film available in several thicknesses. Both cloth and film in cut sheets or rolls. Write today for free samples.

Arkwright—Interlaken, Inc., Arkwright Finishing Division, Fiskeville, R. I.

It's precisely right on Arkwright!

Arkwright-Interlaken, Inc.

ARKWRIGHT
FINISHING DIVISION

Public Works

Arthur J. Hughes of the North Carolina Highway Department has been named assistant division engineer at Sylva, succeeding **Paul J. DuPre,** who has been moved to area maintenance engineer at Raleigh.

J. C. Koch, Louisville realtor, has been named to the City-County Planning and Zoning Commission.

Buell E. Wilcox has been named chief of the engineer division of the Portland District for the Corps of Engineers. He replaces **Ben L. Peterson** who retired. A former instructor in engineering at the Oregon State College, Mr. Wilcox joined the Army engineers in 1935.

Jack H. Gould, former city engineer of Richmond, Va., has been appointed assistant chief engineer of the San Francisco Bay Area Transit District. In his new position he will assist in supervising the design and planning of the area's proposed regional rapid transit system. Since graduation from the Virginia Military Institute, Mr. Gould has been connected with highway, port, railroad and airport construction projects in the U. S., the West Indies and the Pacific.

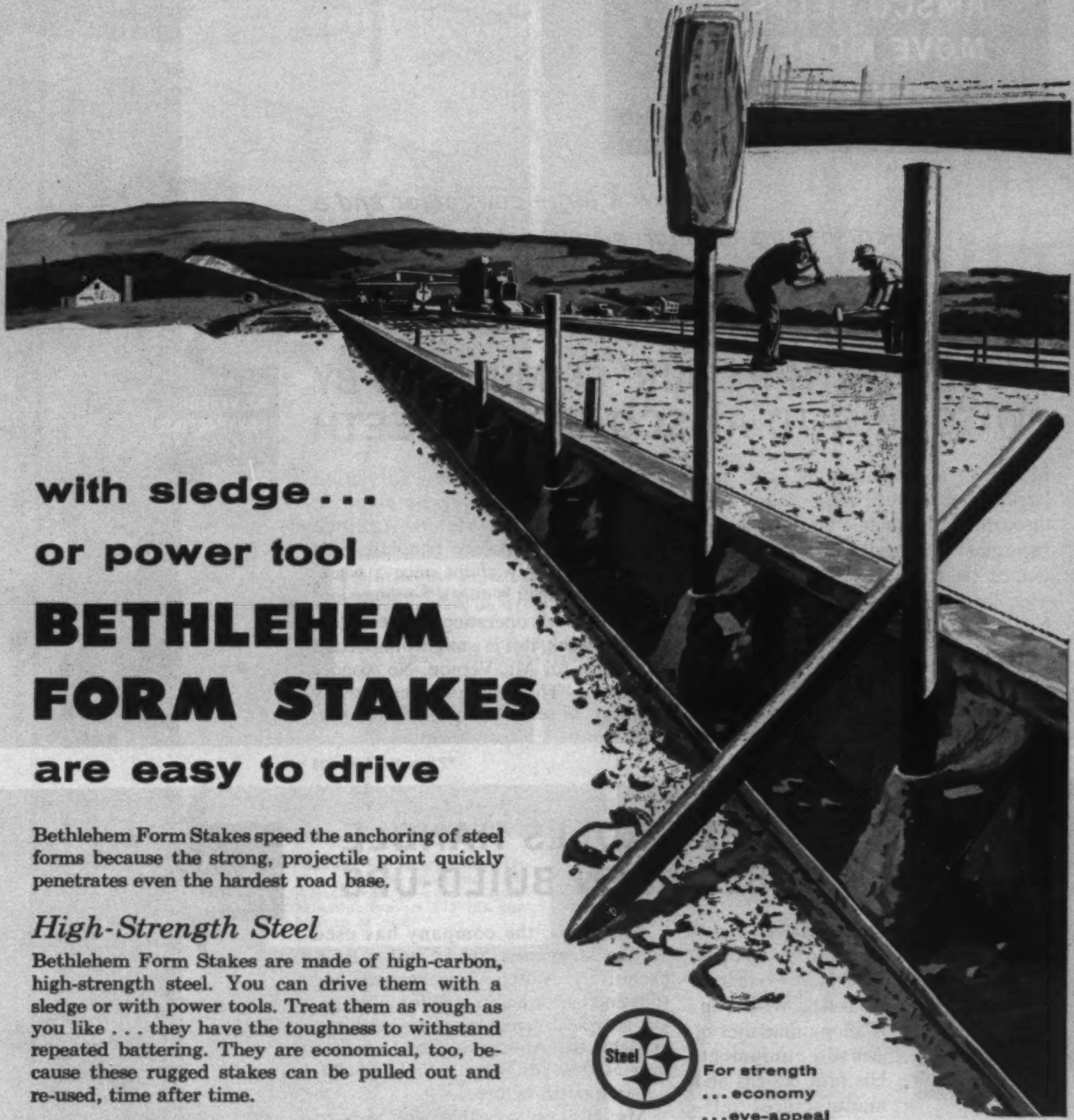
Charles E. Remington has been transferred from the Pacific Northwest regional office of the U. S. Forest Service, Portland, Ore. to the post of assistant regional forester in Denver, Colo. With this promotion, Mr. Remington supervises the division of engineering in the Rocky Mountain region. He joined the service in 1935 as assistant civil engineer in the regional office at Missoula, Mont.

Harold Tilsey, Great Falls, Mont., area engineer for the Bureau of Public Roads, is the new district engineer for Northern Idaho. Headquarters is in Boise. He is succeeded in Great Falls by **A. M. Lewis,** former assistant office engineer of the Montana Bureau of Public Roads.

Eugene Thompason Jr. is the new materials and testing engineer for the North Carolina Highway Department. He has been in the Raleigh testing office since 1955 and with the department for 25 years.

Albert E. Johnson succeeds **Albert G. Skelton** as district engineer at Portland for the Oregon State Highway Department. Mr. Johnson has been assistant district engineer. Mr. Skelton retires after 40 years with the department.

L. G. Byrd, maintenance engineer for the Ohio Turnpike since 1956, has resigned to become highway editor for Public Works Publications.



with sledge...

or power tool

BETHLEHEM FORM STAKES

are easy to drive

Bethlehem Form Stakes speed the anchoring of steel forms because the strong, projectile point quickly penetrates even the hardest road base.

High-Strength Steel

Bethlehem Form Stakes are made of high-carbon, high-strength steel. You can drive them with a sledge or with power tools. Treat them as rough as you like . . . they have the toughness to withstand repeated battering. They are economical, too, because these rugged stakes can be pulled out and re-used, time after time.

Bundled for Easy Handling

The stakes are made in any diameter and can be furnished in various lengths. Strapped in one-man bundles, they are easy to handle and store.

Other Styles Available

In addition to the plain-end stake, Bethlehem Form Stakes can also be supplied with chamfered ends to minimize mushrooming, and with various upset ends to meet special needs.

Steel

For strength
...economy
...eye-appeal

Other Uses

Bethlehem Form Stakes can also be used as drift bolts to stabilize waterfront piling and as timber dowels. Tell us about your requirements. Get in touch with the Bethlehem sales office nearest you. Or write to us at the address below.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

More proof that...

AMSCO HELPS YOU MOVE MORE TONS PER DOLLAR

How a large contractor and a crusher manufacturer have cut downtime and increased service life with AMSCO equipment

AT MT VERNON CONTRACTING CORP.

DAILY "TOOTH REPAIR" ELIMINATED BY SWITCHING TO AMSCO 2-PART TEETH

Mount Vernon Contracting Corp. is a large general contractor doing work throughout the middle Atlantic states. Its present contract is for road construction on the Cross Westchester Expressway, linking the New York State and New England Thruways.

The firm's four power shovels and two backhoes on this job are equipped with Amsco dippers or dipper parts and Amsco Simplex* 2-Part Teeth. Reason: competitive teeth previously used required daily welding build-up to maintain their points. Now, since switching to the Amsco Simplex, teeth are changed only about once a week. And change-over is *only a 5-minute job!*

With shovels operating 8 hours a day, 5 days a week, this is a mighty important advantage for Mt. Vernon. No wonder they say—"These Simplex teeth really stand up in service, especially in rock, and save us a lot of downtime."

*Patent No. 2,904,908

AT HIGHWAY MACHINERY COMPANY

AMSCO CRUSHER ROLLS HANDLE 50,000 YDS. BETWEEN BUILD-UPS

Carroll Hicken (left) owner of Highway Machinery Company, Waukesha, Wisconsin, is a long-time user of Amsco equipment. His firm designs and manufactures self-propelled machines for crushing road material, both gravel and stone. All of their machines are rented out or sold to contractors, with maintenance and service handled by Highway Machinery.

For years, the company has used Amsco Manganese Steel Crusher Rolls exclusively. Amsco Manganese welding rods and bars are also used for build-up. On a typical rental machine, pictured at right, the Amsco rolls had *crushed over 50,000 yds. since their last build-up* six months before.

Mr. Hicken says that with Amsco Manganese rods he can multiply the life of a roll by 5 to 10 times. He adds—"They have proven very fine, and we're getting more yardage than with any rods we formerly used."

AMSCO

AMERICAN Brake Shoe COMPANY

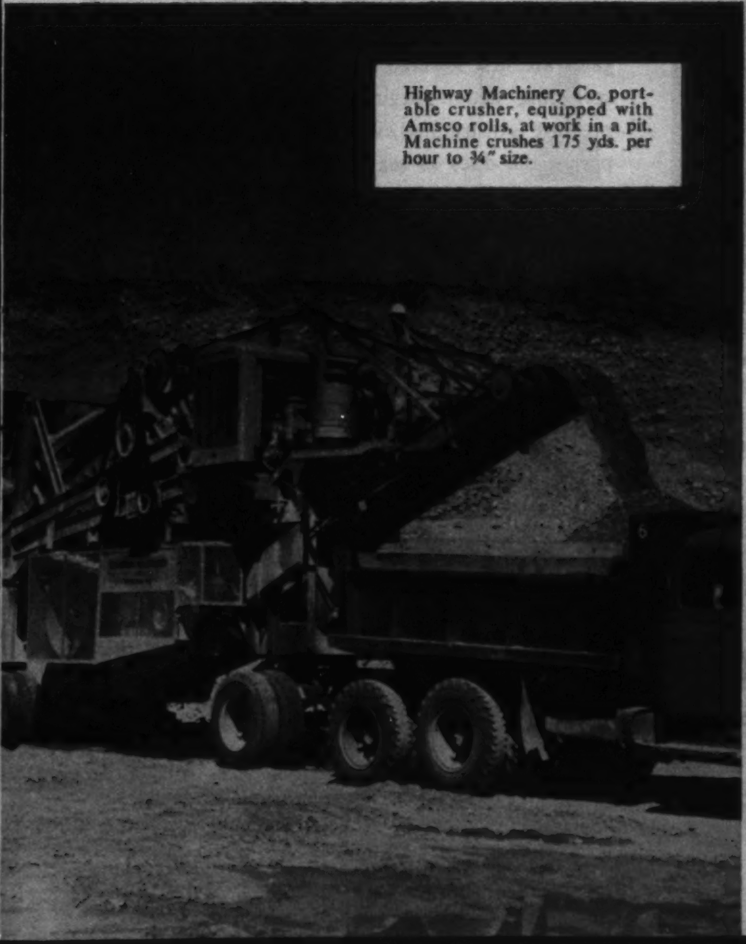
American Manganese Steel Division • Chicago Heights, Ill.

Other plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis
In Canada: Joliette Steel and Manitoba Steel Foundry Divisions
Welding products distributed by Canadian Liquid Air Co., Ltd.

◀ Northwest shovel, equipped with Amsco Dipper and Simplex 2-Part Teeth, at work on Cross Westchester Expressway project.

Shovel operator, Walter Reich, inspecting Amsco Simplex 2-Part Teeth used on Mt. Vernon Contracting Corp. shovel. ▶

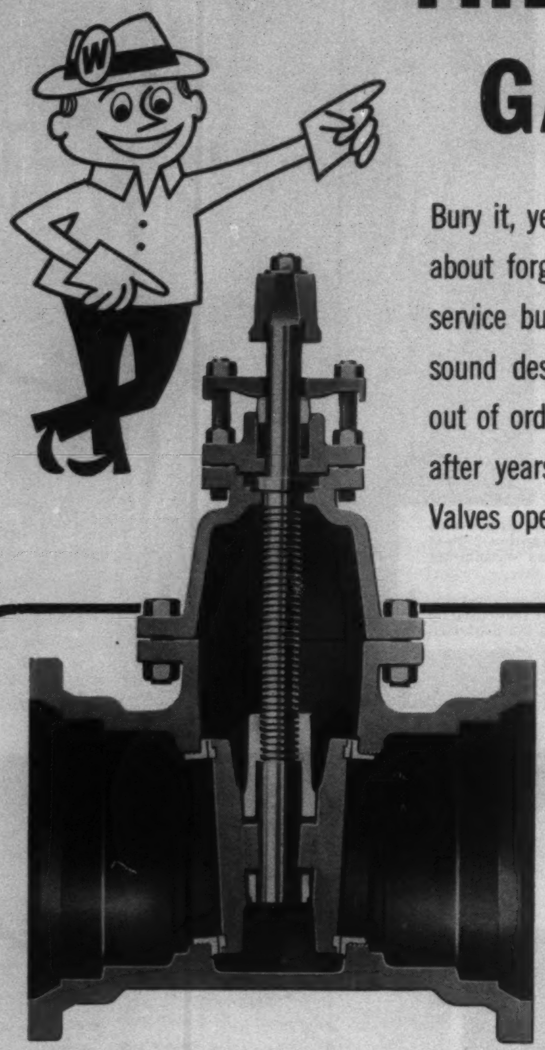
Highway Machinery Co. portable crusher, equipped with Amsco rolls, at work in a pit. Machine crushes 175 yds. per hour to ¾" size.



Amsco 25 x 24 manganese steel crusher rolls, of type used in portable crusher at left.

Welder demonstrating how Amsco Manganese rods are used for build-up on rolls.

THE R. D. WOOD GATE VALVE



Bury it, yes, and if R. D. Wood made it, you can just about forget it, too. There are generations of reliable service built into the R. D. Wood Gate Valve. Simple, sound design is the secret; no delicate parts to get out of order, no pockets to fill up with sediment. Even after years of idleness in the lines, R. D. Wood Gate Valves operate easily, smoothly.

ONLY THREE MOVING PARTS:

The spreader and two discs comprise the complete internal mechanism. In closing, gates are first lowered into position before spreading action begins. Then spreading pressure is distributed evenly from the hub to permit the discs to seat without distortion. Both discs are equally tight against pressure from either side of valve.

AND THESE FEATURES, TOO: Made of thoroughly seasoned castings, rigidly inspected and tested to 300 pounds hydrostatic pressure. Available with bell, mechanical joint or flange pipe connections; conventional or "O" ring packings.

Conform to latest AWWA specifications

R. D. WOOD COMPANY

Public Ledger Building, Independence Square, Philadelphia 5, Pa.

Manufacturers also of Mathews Modernized Hydrants, Mathews Flange Barrel Hydrants, R. D. Wood Hydrants, and "Sand-Spun" Pipe (centrifugally cast in sand molds)

Obituaries

Morris Llewellyn Cooke, 87, a consulting engineer who has served city, state and nation. Mr. Cooke was director of public works for Philadelphia from 1911 to 1923; a member of the New York State Power Authority for the hydro-electric development of the St. Lawrence River in 1931; and the first head of the Rural Electrification Administration from 1935 to 1937. He was also active for many years in the fields of unemployment problems and labor disputes.

S. Herbert Taylor, 58, a founder and partner of Sherman, Taylor & Sleeper, consulting engineers of Camden, N. J. He has been president of the New Jersey State Board of Professional Engineers and Land Surveyors and of the New Jersey Society of Professional Engineers. Mr. Taylor has also served as a director of the National Society of Professional Engineers.

Frederick C. Stauffen, 68, retired Baltimore civil engineer and marine salvage expert Mr. Stauffen was the author of *Scrapping Steel Vessels*.

Ray Raneri, chief of experimental facilities at the Robert A. Taft Sanitary Engineering Center in Cincinnati, Ohio. Mr. Raneri helped design the Taft Center in 1948 and remained in charge of the complex facilities.

James A. Murray, 57, associate professor of civil engineering at Massachusetts Institute of Technology. Mr. Murray has also served as advisor to Iraq in establishing that country's modern cement manufacturing industry.

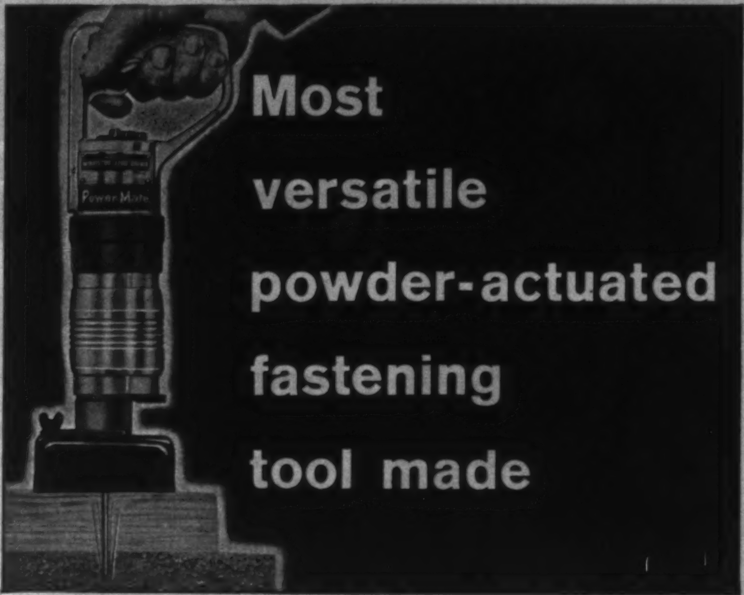
James H. Cornell, 60, chief purchasing agent for George F. Driscoll Co. and Moccia Construction Corp., both of New York City.

William H. Engelman, 77, retired engineer for the City of Cleveland, Ohio. Since his retirement, he has been with the Foundry Equipment Co., Cleveland.

S. Herbert Taylor, 58, construction and traffic engineer who helped design the western end of the New Jersey Black Horse pike and part of the New Jersey Turnpike. He was a founder and partner of Sherman Taylor and Sleeper, consulting engineers, Camden.

Earl Kearns, 60, superintendent of water works for High Point, N. C. for 35 years.

Remington Stud Driver



The basic Power Unit...

Here's the single basic tool that gives you a new degree of on-the-job fastening versatility. Only *one* basic unit to buy—the Remington Model 455A—for all your fastening applications. Just choose the instantly interchangeable fastening attachment you need to do the job!

Plus choice of 4 fastening attachments...

K-1 1/4" & 3/8" Light-Duty Captive Stud Attachment uses 22 cal. Power Loads. Use where extra safety is needed.

K-2 1/4" Light-Duty Attachment uses 22 cal. Power Loads. Handles 80% of your fastening jobs.

K-3 3/8" Medium-Duty Attachment drives heavy-duty studs with inexpensive 22 cal. Power Loads.

K-4 3/8" Medium and Heavy-Duty Attachment. Uses both 22 and 32 cal. Power Loads. For toughest jobs.

offers greatest single-tool fastening versatility!

The Remington Stud Driver offers these exclusive features:

- Four fastening attachments for light, medium, heavy-duty work, including the special Captive Stud Attachment for extra-safe fastening. No other single tool can cover such a variety of applications.
- Medium-duty fastening—requiring ⅜" studs—can be done with low-cost 22 caliber Power Loads.
- Positive one or two-hand operation at operator's option . . . no buttons or release to hold while fastening.
- Greater variety of applications made possible with instantly interchangeable guards. These 4" square, hollow "safety guards" fit snugly over work, trap spall and dust. More than 40 types are available.

Send coupon for free booklet about the Remington Stud Driver—your best buy in powder-actuated fastening tools!

Remington

DU PONT

Remington Arms Company, Inc., Bridgeport 2, Conn.
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FREE POWER TOOL CATALOGS

Remington Arms Company, Inc., Bridgeport 2, Conn. ENR-4
Please send—without obligation—information on Remington Contractor & Industrial Equipment checked below:

☐ Stud Drivers ☐ Air Tools ☐ Chain Saws
☐ Concrete Vibrators ☐ Flexible Shaft Machines

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*Company*________________________________
*Address*________________________________
*City*__________________*Zone*_____*State*_______

"We carry up to 2,500 lb. more FORD Tandems and still outrun

SAYS HARRY R. KUNZ
PRESIDENT, KUNZ PAVING CO.
SAN MATEO, CALIFORNIA

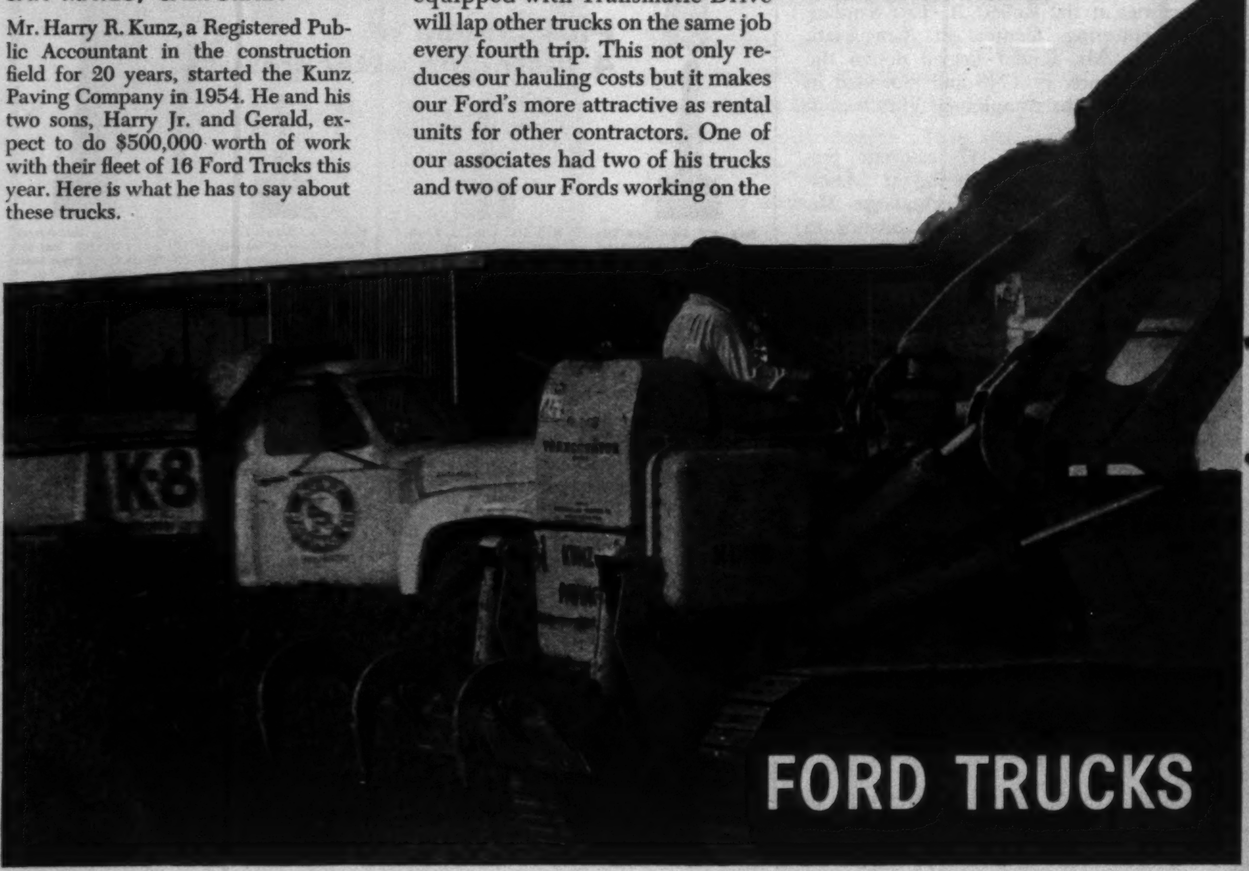
Mr. Harry R. Kunz, a Registered Public Accountant in the construction field for 20 years, started the Kunz Paving Company in 1954. He and his two sons, Harry Jr. and Gerald, expect to do $500,000 worth of work with their fleet of 16 Ford Trucks this year. Here is what he has to say about these trucks.

"Our experience with Fords has proved them to be the best all-around truck we can buy! They haul more payload, cut down considerably on trip time and cost less to operate and maintain.

"The lighter chassis weight of the Ford Tandems lets us carry as much as 2,500 pounds more than competitive makes. This extra payload means that we can haul as much in ten trips as the others do in eleven. Our Fords will beat them on a trip-for-trip basis, too!

"On a 30-mile haul, our '59 T-800 equipped with Transmatic Drive will lap other trucks on the same job every fourth trip. This not only reduces our hauling costs but it makes our Ford's more attractive as rental units for other contractors. One of our associates had two of his trucks and two of our Fords working on the same job. He actually paid for the rental of our trucks by the extra trips they made.

"Our cost records, set up on an hourly basis to make it easier to prepare bids, show that the longer life built into Ford Trucks makes them less costly to operate. We have one '56 Ford T-750 with over 100,000 miles on it that we use as a base for our tandem hauling costs. In spite of its high mileage — gas, oil, tires, maintenance and repairs amount to only $2.08 per hour. Facts and figures like these keep us sold on Ford Trucks for our business."



FORD TRUCKS

payload on our other trucks on the same job!"

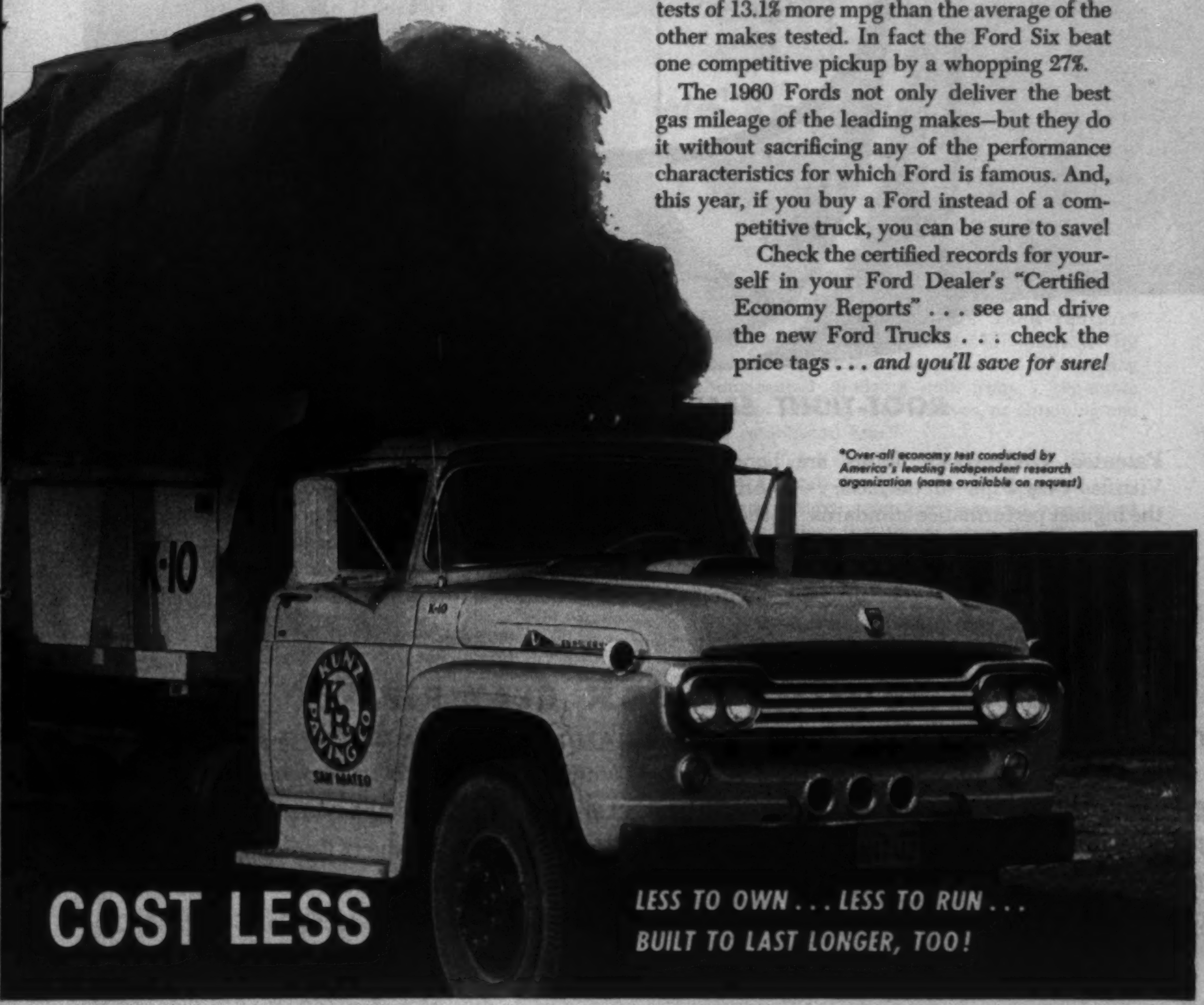
Again in '60... FORD PICKUPS beat all leading makes in Gasoline Economy!

Ford Six delivers 13.1% better gas mileage in second running of Economy Showdown U.S.A.* Standard 1960 ½-ton pickups of the five leading makes were purchased from dealers just as you would and run both empty and loaded, over flat terrain and hills, at low and high speeds, under city traffic and retail delivery conditions.

Certified results show the Ford Six won *every* test—with a combined Ford advantage for all tests of 13.1% more mpg than the average of the other makes tested. In fact the Ford Six beat one competitive pickup by a whopping 27%.

The 1960 Fords not only deliver the best gas mileage of the leading makes—but they do it without sacrificing any of the performance characteristics for which Ford is famous. And, this year, if you buy a Ford instead of a competitive truck, you can be sure to save!

Check the certified records for yourself in your Ford Dealer's "Certified Economy Reports" . . . see and drive the new Ford Trucks . . . check the price tags . . . *and you'll save for sure!*



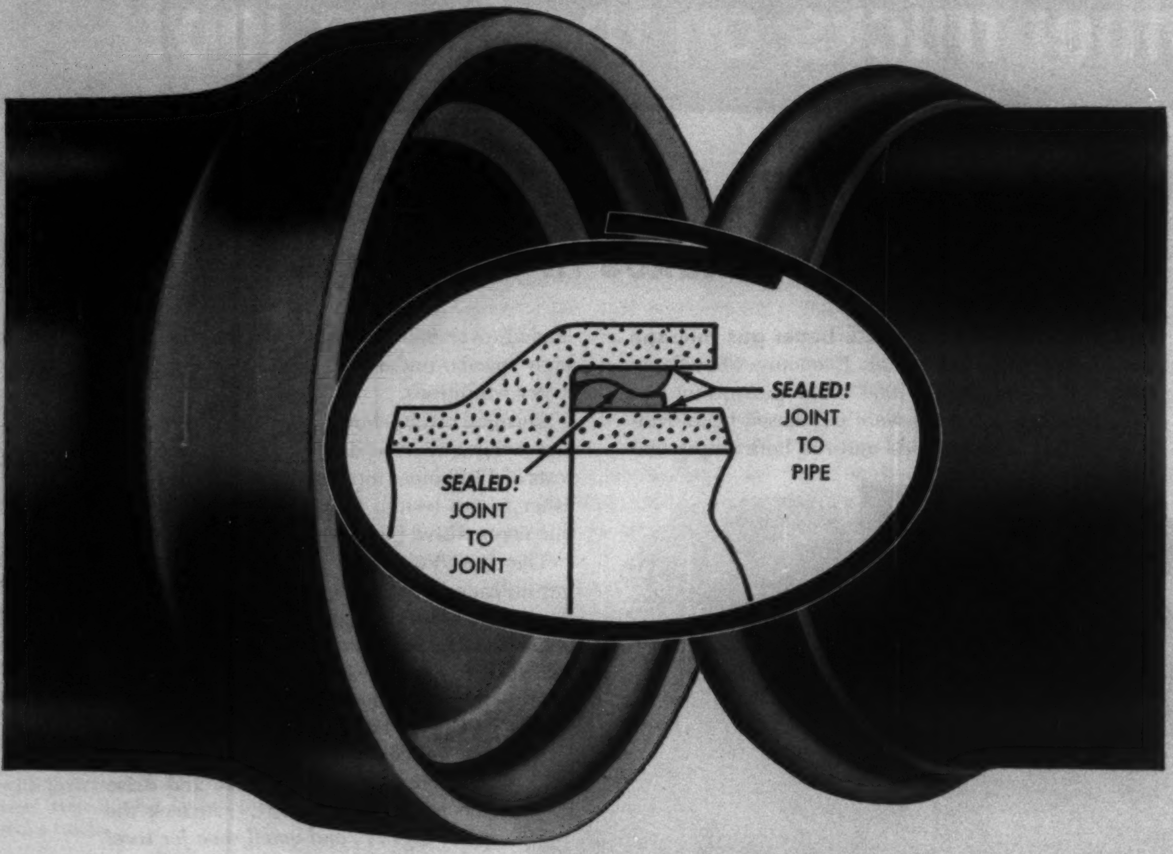
COST LESS

LESS TO OWN . . . LESS TO RUN . . .
BUILT TO LAST LONGER, TOO!

*Over-all economy test conducted by America's leading independent research organization (name available on request)

Wedge-Lock®

HANDLES INFILTRATION!



ROOT-TIGHT SEAL! MINIMUM INFILTRATION!

Patented Wedge-Lock Joints are bonded to Vitrified Clay Pipe—*at the factory*—to bring you the highest performance standards . . . the lowest installation costs.

One simple, easy operation and the joint's tightly sealed around the full pipe circumference . . . stays in continuous compression for the life of the pipe. When you specify Wedge-Lock, you reduce infiltration and resist root problems before they start . . . keep installation costs down . . . benefit from the guaranteed performance of the world's longest-lasting pipe.

Write to listed manufacturers for literature or an actual Wedge-Lock demonstration

Wedge-Lock CLAY PIPE

THE FACTORY-JOINTED CLAY PIPE AVAILABLE NATIONALLY FROM LOCAL MANUFACTURERS

Order Wedge-Lock from any of these Vitrified Clay Pipe Manufacturers:

Cannelton Sewer Pipe Company..Cannelton, Ind.	**Larson Clay Pipe Company**.........Detroit, Mich.
The Clay City Pipe Company....Uhrichsville, Ohio	**The Logan Clay Products Company**..Logan, Ohio
The Evans Pipe Company.......Uhrichsville, Ohio	**The Robinson Clay Product Co.**.......Akron, Ohio
Graff-Kittanning Clay Products..Worthington, Pa.	**The Stillwater Clay Products Co.**..Cleveland, Ohio

Superior Clay Corporation......Uhrichsville, Ohio

WLC-159-188-A

Books

Ideas in Pictures

Architectural Rendering, by Albert O. Halse, 277 pages, F. W. Dodge Corp., New York, N. Y. $15.75.

In planning an idea, selling a concept and finally building a structure a well executed rendering in the proper media will often accomplish more than bails of plans and hours of explanation.

There have been many volumes describing one or another methods of illustrating for architectural and engineering work, but few that tried covering the field of techniques and media. Albert O. Halse, for 13 years a teacher of delineation at Columbia University's School of Architecture, has gathered in this book a comprehensive analysis of rendering that starts with basic rules and proceeds through a variety of rendering techniques.

Beginning with brief chapters on perspective, composition, study of light and proper use of color, Mr. Halse goes on to consider nine separate rendering techniques. Individual chapters detail work in pencil, pen and ink, smudge charcoal, Chinese ink, water color, tempera, airbrush and pastel. Illustration examples from many sources accompany each chapter.

The book forms both a guide for the student and at the same time a substantial reference work for the practicing designer.

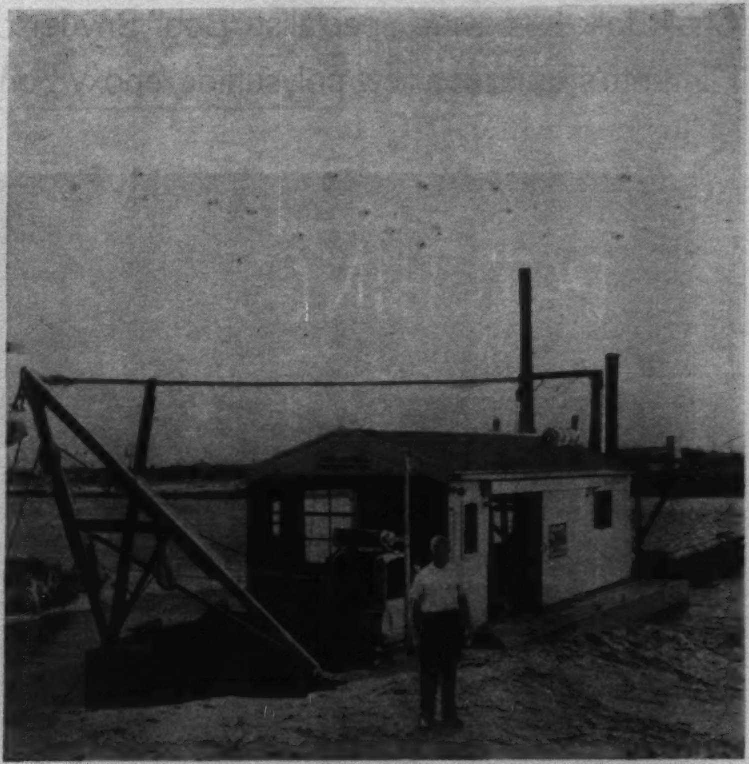
Reinforced Concrete Design

Examples of the Design of Reinforced Concrete Buildings—By Charles E. Reynolds. 266 pages. Concrete Publications Limited. London. $3.00.

The author has revised this book to conform with the revised British Standard Codes No. 114 (1957) "The Structural Use of Normal Reinforced Concrete in Buildings". This is the British counterpart of the American Concrete Institute's revised "Building Code Requirements for Reinforced Concrete" (AC1318-56).

The text in Part I discusses provisions of the new code–e.g., revised bending-moment factors, load factor method, concentrated loads on one and two-story slabs, and flat slabs analyzed as integral parts of building frames. Part I also explains and illustrates the moment distribution method applied to continuous frames.

Part II, entitled "Design of a Building," has 21 calculation sheets and 17 pages of design and detail drawings. The author has provided alternative designs for beam-and-slab, flat slab, and two-way slabs.



"We know the value of a completely engineered ELLICOTT DREDGE"

Says Mr. Leonard Mulbry of the New Smyrna Dredging Company, operating in the waterway community "VENEZIA," at New Smyrna Beach, Florida. "This is our third year of operation with the dredge "Bold Venture" obtained from Ellicott in 1957," continues Mr. Mulbry. "By now we have been able to determine the value of obtaining a completely engineered dredging unit from a reputable company, rather than building one ourselves, or obtaining one from a less well established firm."

"We are more than satisfied with the production and operation of our Ellicott 'DRAGON®' Dredge. It is not only well engineered and accurately constructed, but easy and economical to operate. Our records show that *this purchase was the wisest decision we ever made.* Per dollar invested in the dredge and its operation, we are able to get about twice the land area pumped up as by other means. We estimate the *savings will be close to $500,000* by the time the project is completed."

You can enjoy similar savings with an Ellicott "DRAGON®" Model Dredge, designed and manufactured by a company now marking its 75th year in designing and building dredges and dredging equipment. Write for information to Ellicott Machine Corporation, 1603 Bush Street, Baltimore 30, Md.

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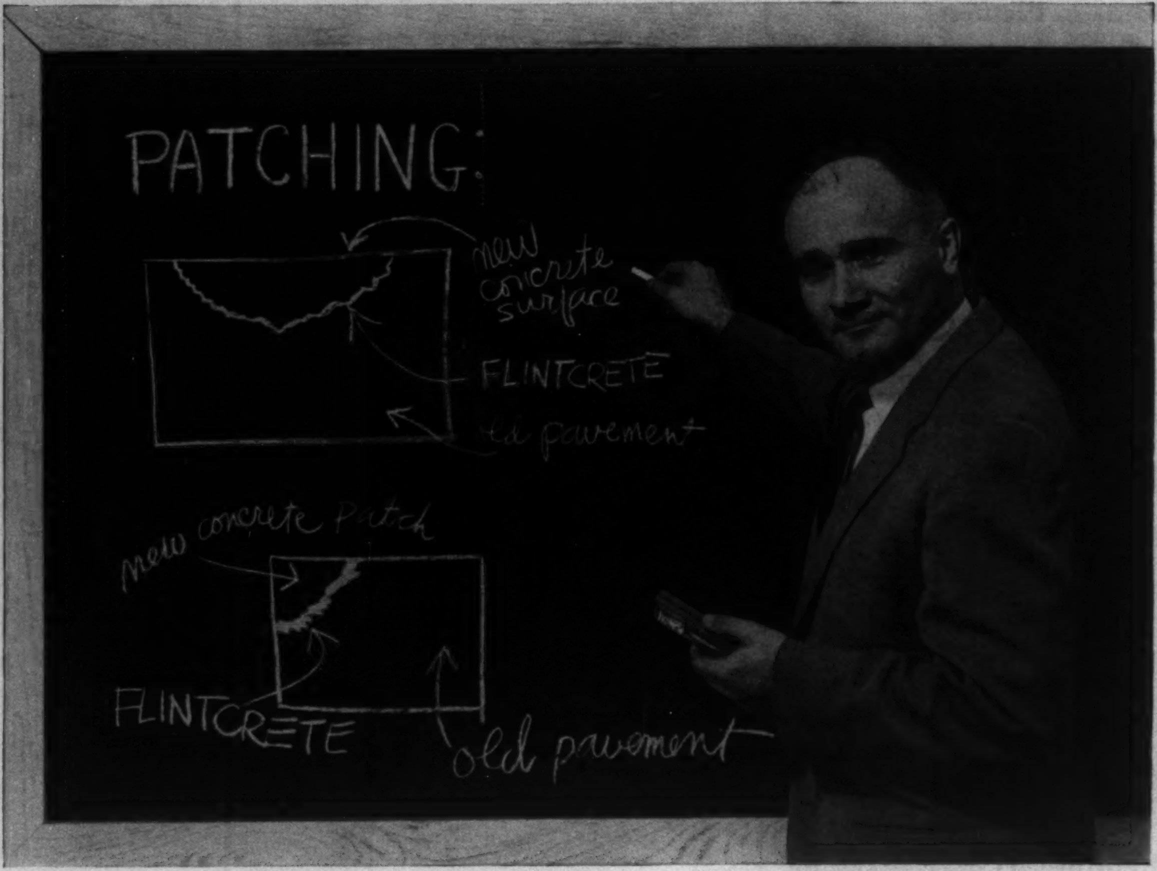
Successors to the floating dredge business of the Bucyrus-Erie Co. and the American Steel Dredge Co. Complete engineering, design and construction services.

Chalk talk by paving specialist "Bob" Snyder on Flintcrete—
Flintkote's amazing new polysulfide/epoxy bonding compound...



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"The secret's in Flintcrete's bonding power. It can bond concrete to concrete in a 'weld' up to 12 times stronger than concrete itself.

"This extremely high bonding strength really pays off when you're preparing existing concrete surfaces for repair. It's not necessary to remove the slab; only the unsound area need be cut away. And be certain you use a quality compound—the right one for the job at hand."

Flintcrete can be used for a wide range of other jobs too:

- bonding overlays to existing concrete surface
- bonding precast materials, markers, refractory brick
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Unit Prices

Four pipe alternates priced for . . .

Water Transmission Line

Kirkland, Wash., is spending $218,413 to increase its water supply by the addition of a transmission line to connect a new source of water to the existing supply, and for modifications of its distribution system.

R. W. Beck & Associates, Seattle, Wash., is the consultant.

Contractors were given their choice of cast iron, steel, concrete cylinder and asbestos cement pipe for the transmission line, and a choice of alternate gate valves and hydrants for the distribution system modifications.

Frank Coluccio Construction Co., Inc., Seattle, placed the low bid on a combination of the two contracts. The award, on the concrete cylinder pipe transmission line alternate, was 14.4% under the engineers estimate and $3,035 over Coluccio's bid on the steel pipe alternate. The award breaks down like this:

Transmission line	$60,046
Distribution system modifications	158,367*
Total	$218,413

* On alternate Mueller gate valves and hydrants

The low bid of $57,955 on the concrete cylinder pipe transmission line alternate was placed by Mallory & Compton, Inc., Seattle, and on the cast iron pipe alternate, low bidder was F. H. Schade, Inc., Auburn, Wash., at $62,638. However, neither of these contractors priced the distribution system modifications. Tri-State Construction Co., Seattle, Wash., was low on the asbestos cement pipe alternate, and he was second low for the combined contracts.

The following tabulation shows how the successful bidder priced the concrete cylinder pipe, and gives the unit prices quoted by the low bidders on the three pipe alternates for the transmission line.

Transmission Line

Concrete Cylinder Pipe Alt.

1	Mallory & Compton, Inc., Seattle	$57,955
3C	Frank Coluccio Constr, Co., Inc., Seattle	60,046
11	O. R. Alia, Inc., and Erickson Paving Co., Seattle	72,656

Cast Iron Pipe Alt.

1	F. H. Schade, Inc., Auburn, Wash.	$62,638
2	Argenteiri Constr. Co., Seattle	64,308
7	Harold Kaeser, Seattle	82,783

Steel Pipe Alt.

1	Argenteiri Constr. Co., Seattle	$56,308
2	Frank Coluccio Constr. Co., Seattle	57,011
10	Harold Kaeser, Seattle	69,456

Asbestos Cement Pipe Alt.

1	Tri-State Constr. Co., Seattle	$67,682
2	Argenteiri Constr. Co., Seattle	68,018
5	Harold Kaeser, Seattle	80,011

Bids: 2-11-60 Items	Unit	Quantity	Unit Prices			
			Conc Cyl Pipe 3C	CI Pipe 1	Steel Pipe 1	Asb Cmt Pipe 1
Exc, trench	lf	5,400	$2.50	$2.00	$1.90	$1.58
rock	cy	50	0.20	10.00	10.00	8.00
Granular fill	cy	300	....	....	5.00	....
Sand	cy	50	3.50	5.00	4.00	6.00
Layer pit run, 12"	lf	600	0.75	0.70	1.00	0.50
cr rock, 4"	lf	600	0.75	0.23	0.50	0.50
CIP, 16", cl 150	lf	2,400	....	8.80	....	....
cl 200	lf	3,000	....	9.10	....	....
Steel pipe, 16"	lf	5,400	....	....	6.97	....
Conc cyl pipe, 16", cl 135	lf	2,400	7.48	....	....	....
cl 175	lf	2,100	7.27	....	....	....
cl 200	lf	900	7.58	....	....	....
Asb cmt pipe, 16" cl 150	lf	2,400	....	....	....	8.90
cl 200	lf	3,000	....	....	....	10.90
Gate valves, 12"	ea	3	400.00	200.00	350.00	260.00
8"	ea	2	135.00	100.00	130.00	....
10"	ea	2	....	....	....	105.00
P.R.V, 12" instal	ea	1	3,350	1,200	3,750	2,400
Air & vac vlv	ea	1	600.00	110.00	250.00	400.00

The bidding on the distribution system modifications went like this:

Distribution System Modifications*

1C	Frank Coluccio Constr. Co., Inc., Seattle	$158,367
2	Tri-State Constr. Co., Seattle	163,283
7	Wesco-Stoen, Seattle	206,132

*Using alternate Mueller gate valves & hydrants

Bids: 2-11-60 Items	Unit	Quantity	Unit Prices	
			1 C	2
Excavation, common	lf	26,100	$1.00	$1.19
rock	lf	50	0.25	8.00
Sand	lf	50	3.75	5.00
Pit run grav, 12" layer for				
4" pipe	lf	900	0.70	0.36
6" pipe	lf	2,000	0.50	0.36
8" pipe	lf	4,200	0.60	0.36
10" pipe	lf	100	0.50	0.38
12" pipe	lf	2,400	0.60	0.40
Crushed rock, 4" layer for				
4" pipe	lf	100	0.60	0.30
6" pipe	lf	100	0.60	0.30
8" pipe	lf	2,200	0.60	0.30
10" pipe	lf	100	0.60	0.32
12" pipe	lf	2,400	0.50	0.34
A-C pipe, 4"	lf	1,050	2.37	2.08
6"	lf	8,650	2.60	2.68
8"	lf	8,050	3.26	3.41
10"	lf	4,700	4.27	4.30
12"	lf	3,650	5.33	5.50
CIP, 4"	lf	40	4.00	4.75
6"	lf	330	5.40	5.25
Casing pipe, 16"	lf	152	30.00	28.00
20"	lf	108	36.00	31.00
Gate valves, 4"	ea	12	60.00	57.00
6"	ea	65	77.00	72.50
8"	ea	20	109.00	97.00
10"	ea	7	159.00	145.00
12"	ea	7	189.00	160.00
Alt. Mueller gate vlvs, 4"	ea	12	60.00	60.00
6"	ea	65	77.00	72.50
8"	ea	20	109.00	100.00
10"	ea	7	159.00	149.50
12"	ea	7	189.00	179.50
Hydrants	ea	22	180.00	175.00
Alt. Mueller hydrants	ea	22	148.00	187.00
Service connection, ¾"	ea	85	20.00	26.00
1"	ea	15	20.00	35.00
P.R.V., 8", instal	ea	1	1,710	1,000
10" instal	ea	2	2,000	1,750
4", replace existing	ea	1	425.00	650.00
6", replace existing	ea	1	600.00	750.00
Blowoff assembly, 6"	ea	1	260.00	415.00

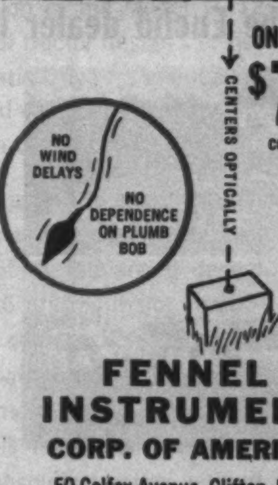
Completion schedule: 120 cal days
Liquidated damages: $100/day

(Unit Prices continued on p. 114)

Fennel

OPTICAL PLUMMET ENGINEER'S TRANSIT

ONLY $725 complete with tripod



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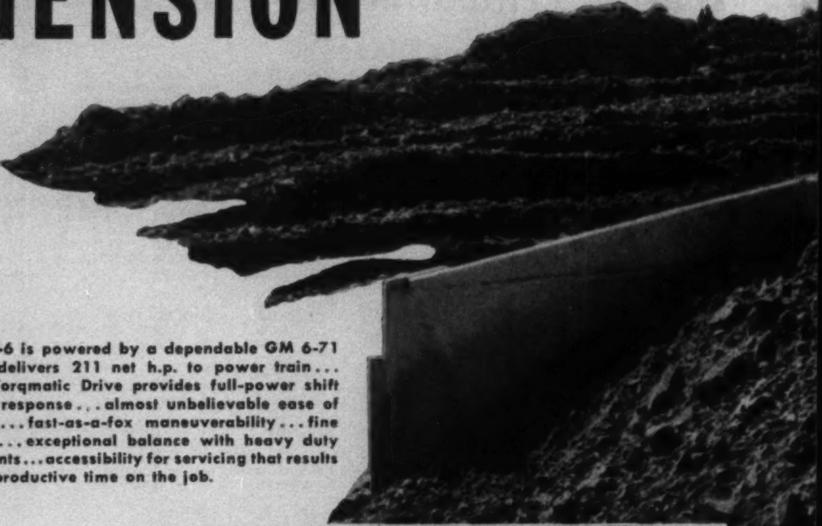
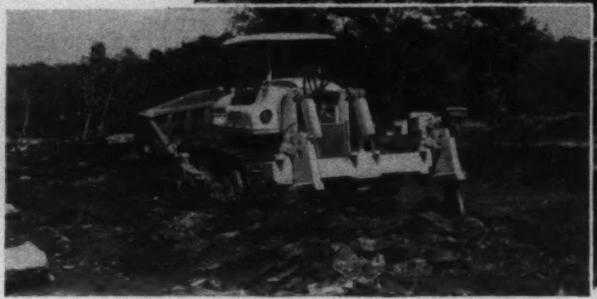
EUCLID'S GREATER DIMENSION



Model C-6 is powered by a dependable GM 6-71 engine; delivers 211 net h.p. to power train... proven Torqmatic Drive provides full-power shift and fast response... almost unbelievable ease of handling... fast-as-a-fox maneuverability... fine visibility... exceptional balance with heavy duty attachments... accessibility for servicing that results in more productive time on the job.

The C-6 has the speed, power and maneuverability to handle every kind of tractor job... ripping, dozing, push loading, clearing, towing and other heavy work. Many major components including Torqmatic Drive, engine, and planetary drive axle have been job proved in thousands of Euclid earthmovers. Owners say that full-power shift, easy operation and fast response give the C-6 more work-ability than any other crawler in the 200 h.p. class.



Facts and figures on the Model C-6 and Model TC-12 "Eucs" are available from the Euclid dealer in your area . . . get in touch with him soon!

Greater Dimension in power and performance... TC-12 has 2 engines that deliver a total of 425 net h.p.... independent track drive with separate power train and Torqmatic Drive for each track... full-power shift and instantaneous reverse... 8 track rollers... unequalled accessibility for servicing... maneuverability and workability that have set new standards of big tractor performance.

Proven Torqmatic Drives deliver a smooth flow of power to each track... with full-power shift there's no delay for clutching and shifting... change direction with a flick of the wrist... 425 total net h.p. is automatically matched to every job requirement... rigid track alignment maintained by independently suspended track frames and final drives... years-ahead engineering reduces downtime and maintenance costs for a better return on investment.

Crawlers without full-power shift are obsolete . . . and costly!

GM GENERAL MOTORS

EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

IN MODERN CRAWLER DESIGN

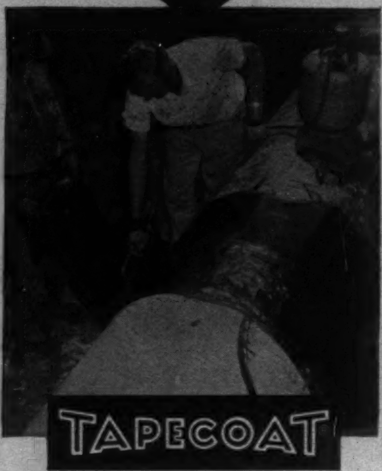
With over twenty-five years of experience in building heavy earth-moving equipment exclusively, Euclid offers a greater range of types and capacities, a greater background of field experience, and a greater return on your equipment investment.

One example of this greater dimension was the introduction of the Model TC-12 Crawler over 5 years ago. Here was an entirely new concept of tractor design . . . two engines, each driving a separate track through its own Torqmatic Drive . . . unequalled power and work-ability . . . performance that set a new standard of crawler productivity . . . ease of operation and servicing that is still unsurpassed in the industry.

Recently the Model C-6 Euclid tractor went into production after the most comprehensive field trials and proving ground testing ever given any new Euclid model. It, too, has Torqmatic Drive and full-power shift as well as many of the advanced design features of the bigger TC-12. And like the "Twin", the new C-6 utilizes major components that have been job proved in thousands of "Eucs" in construction, mine and quarry service. For instance, the Allison converter and semi-automatic transmission "package" has long since passed the pioneering and development stage . . . it's been used in "Euc" scrapers, rear-dump haulers and other models for years. These two Euclid crawlers provide so much more work-ability that they obsolete tractors without the operating advantages of full-power shift.

EUCLID **Division of General Motors** • **Cleveland 17, Ohio**

The **PROVED** Way to
CUT CORROSION COSTS!



Helps Add Years of Service Life to Underground Lines

No other tape can match the 18-year protection record of TAPECOAT, the quality coal tar coating in tape form. Steel pipe and other vulnerable surfaces TAPECOATED back in 1941 still show no signs of deterioration.

Field application costs are lower with TAPECOAT because it is so easy to apply with the use of a torch. No trained help required.

TAPECOAT comes in rolls of 2", 3", 4", 6", 18" and 24" widths and is applied spirally or by "cigarette wrapping."

You can depend on TAPECOAT for protecting pipe, pipe joints, fittings, couplings, tanks, conduit, cable, splices, insulated lines, tie rods or wherever severe corrosive or abrasive conditions must be overcome.

A TAPECOAT sales and service engineer will be glad to assist you on your corrosion problems.

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Highway Price Trends in Florida

Average unit bid prices in 1959, by quarters

Items	Unit	Average Unit Prices 1st quar.	2nd quar.	3rd quar.	4th quar.	Year's Total Quantity	Avg. Unit price
Excavation, regular	cy	$0.61	......	......	......	412,153	$0.61
borrow	cy	0.48	0.43	0.46	0.79	11,904,793	0.49
subsoil	cy	0.46	0.45	0.43	0.40	4,176,123	0.44
grading	cy	0.45	0.55	0.49	0.51	14,120,647	0.50
misc	cy	3.96	0.40	0.84	1.58	114,286	0.88
Embankment	cy	1.16	0.88	0.86	1.05	7,488,517	0.96
Stabilizing	sy	0.20	0.21	0.21	0.18	20,823,074	0.21
Base, limerock, 8½" primed	sy	1.39	1.29	1.59	1.42	4,400,253	1.40
6½" primed	sy	0.95	1.15	1.12	1.14	2,420,246	1.08
Stab base, limerock matl	cy	3.75	3.30	4.16	2.83	206,183	3.60
	sy	0.23	0.21	0.25	0.19	1,475,907	0.22
Shell base matl	cy	5.51	6.57	4.97	4.97	99,579	5.27
Sand clay base, 6½" primed	sy	0.50	0.53	0.50	0.60	929,944	0.52
Bit matl, plant mix	gal	0.134	0.129	0.130	0.125	26,870,949	0.130
surf treat	gal	0.177	0.169	0.174	0.163	2,374,523	0.171
cutback	gal	0.183	0.207	0.180	0.120	1,632,959	0.190
Cover material	cy	7.39	7.61	6.55	6.92	140,388	7.17
Surface courses	t	6.80	6.41	6.43	5.70	1,715,753	6.35
ACSC w binder	sy	1.01	1.01	1.01	0.94	6,842,646	1.00
type 1	t	7.37	6.98	7.00	6.05	238,809	6.80
type 2	t	7.39	6.33	7.11	5.40	323,826	6.36
sand asph, hot mix	t	7.51	4.49	6.70	3.80	87,175	4.60
Conc, misc — seal, mass, walls, etc	cy	69.13	70.90	53.91	56.03	21,412	61.33
bridge	cy	67.96	62.08	57.92	53.99	138,537	59.20
culvert	cy	64.56	67.17	59.75	69.07	22,053	62.95
prcst prstr	cy	114.28	62.68	68.51	60.61	46,221	66.92
paving, 8" plain	sy	......	4.50	3.71	5.50	21,186	4.52
7" plain	sy	5.33	......	......	......	9,904	5.33
9" plain	sy	......	4.05	3.75	5.09	278,561	3.98
dowel joints	sy	5.57	5.03	5.41	......	330,765	5.30
Steel, reinforcing	lb	0.128	0.117	0.118	0.117	25,365,469	0.119
structural	lb	0.207	0.278	0.259	0.290	3,497,524	0.270
Concrete pipe, 24"	lf	8.74	8.16	8.04	7.84	114,909	8.22
36"	lf	14.73	15.00	14.86	12.91	48,495	14.29
Cor metal pipe, 18"	lf	4.42	4.73	4.76	4.12	24,964	4.48
24"	lf	6.45	6.13	6.61	5.97	5,638	6.27
Piling, timber	lf	3.50	3.52	2.65	2.50	63,685	3.07
prcst conc, 12" sq	lf	7.18	7.69	6.79	6.75	27,170	7.18
14" sq	lf	8.23	5.88	7.79	5.69	53,560	6.65
18" sq	lf	8.38	7.90	7.89	7.25	399,263	7.79
Grassing	sy	0.041	0.035	0.07	0.044	1,179,764	0.040
Grassing & mulching	sy	0.033	0.034	0.03	0.033	24,190,514	0.033
Concrete handrail	lf	7.94	6.35	5.00	5.52	21,215	6.18
Sand cement riprap	cy	35.25	36.44	37.95	33.02	7,455	35.73
Concrete ditch pvt, 3"	sy	3.42	3.50	3.58	3.57	256,363	3.51
median curb	lf	1.73	1.82	1.70	1.71	430,358	1.74
curb & gutter	lf	1.79	1.90	1.92	1.76	526,214	1.84
sidewalk, 4" thick	sy	3.66	3.88	3.55	3.46	122,461	3.66
Metal guard rail, std	lf	3.12	3.06	3.14	2.73	149,825	3.01
Inlets	ea	338.20	331.65	331.56	341.59	3,109	335.99
Traf separators, 4' wide	lf	4.43	4.78	4.65	4.70	9,181	4.68
Reinf conc prstr beam, type 2	lf	16.48	12.93	12.91	10.49	116,921	12.65
type 3	lf	19.33	14.87	16.72	16.16	113,940	15.97
type 4	lf	......	23.90	25.18	20.99	29,306	24.12
type D	lf	......	15.50	......	......	18,504	15.50
prstr slabs, 10" thick	sf	3.25	3.40	......	......	22,468	3.31
19" thick	sf	......	3.50	6.02	......	72,018	3.60
ACSC pvt, incl 10½" limerock base, ACSC tp 1, 1½" binder, 2" & bit matl	sy	3.05	3.14	2.95	3.27	2,080,842	3.00

Hawaii Missile Sites to Cost $2.2 Million

Nike-Hercules battery sites #6 and 7, on the Island of Oahu, Hawaii, for the Corps of Engineers, Honolulu, will cost $2,219,509. Robert E. McKee General Contractor, Inc., El Paso, Tex., bidding jointly with Nordic Construction Co., Honolulu, took the award on a low bid 14% under the engineers estimate and only 3% under the second low bid.

The contract includes construction of tactical, support and control facilities, excavation, bituminous surface treatment, and these three buildings:

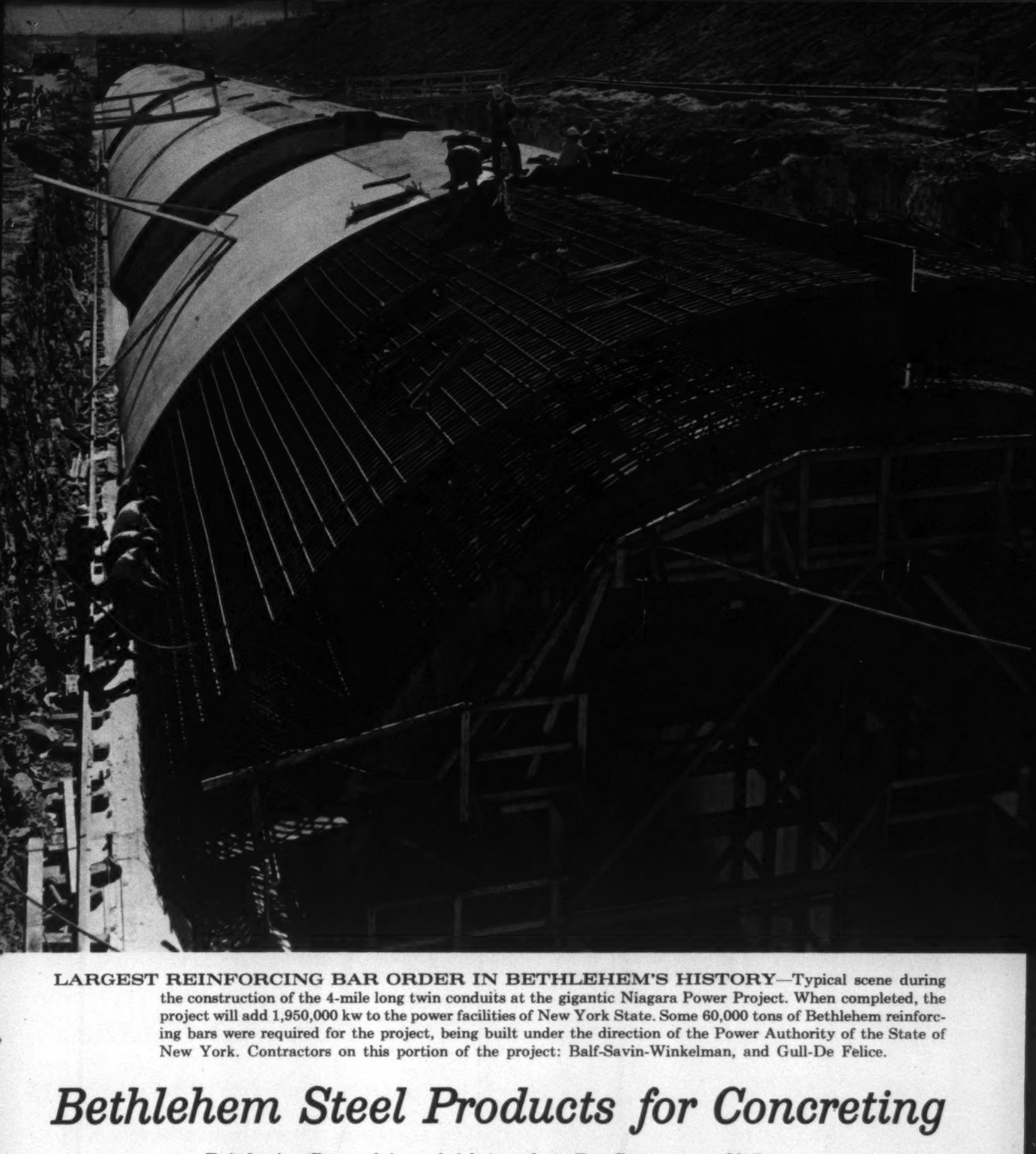
Building	Cost	Area sq ft	Cost/ sq ft	% over engr. est.
22-man barracks & mess hall at launcher area support facility	$80,003	4,257	$18.79	0.5%
18-man barracks & mess hall buildings at control sites #6 & 7 (3,886 sq ft each)	159,053	7,772	20.47	8.2

Minimum wages include: carpenters, $2.95; crane & shovel operators, $2.75-$3.25; graders, $3.00; common laborers, $2.05.

The bidding included:

1C	Robt. E. McKee, El Paso, Tex. and Nordic Constr. Co., Honolulu	$2,219,509
2	Price-McNemar Constr. Co., Van Nuys, Calif.	2,297,900
7	Oahu Constr. Co., Ltd., Honolulu	2,971,400
EE	Corps of Engineers, Honolulu	2,574,640

Bids: 2-17-60 Items	Unit	Quantity	Unit Prices 1 C	2
Tactical facil, constr.	ls	job	$953,520	$831,000
Exc, uncl, launcher sections #1 & 2	cy	320,000	0.95	1.75
Support facilities for launcher area	ls	job	300,220	287,000
control areas #6 & 7	ls	job	225,270	193,000
Launcher section # 3	ls	job	181,193	157,000
22-man barracks & mess hall at launcher area support facilities	ls	job	80,003	91,000
Dbl bit surf treatment	ls	job	16,210	9,900
2 18-man barracks & mess hall bldgs at control sites	ls	job	159,053	169,000



LARGEST REINFORCING BAR ORDER IN BETHLEHEM'S HISTORY—Typical scene during the construction of the 4-mile long twin conduits at the gigantic Niagara Power Project. When completed, the project will add 1,950,000 kw to the power facilities of New York State. Some 60,000 tons of Bethlehem reinforcing bars were required for the project, being built under the direction of the Power Authority of the State of New York. Contractors on this portion of the project: Balf-Savin-Winkelman, and Gull-De Felice.

Bethlehem Steel Products for Concreting

Reinforcing Bars, plain and fabricated . . . Bar Supports . . . Nails and Tie Wire for formwork . . . Bars and Strand for prestressed concrete . . . Tie-Rods . . . Standard and Special Fasteners.

Bethlehem reinforcing bars come in a complete range of sizes, including the giants, 14S and 18S. They're all made of new-billet steel. This is your guarantee of composition, mechanical, and physical properties. When bundles of Bethlehem bars arrive at the job, certified mill test reports, matched with heat numbers, can identify your bars with the specific heat tapped from our open-hearth furnaces.

Steel

BETHLEHEM STEEL

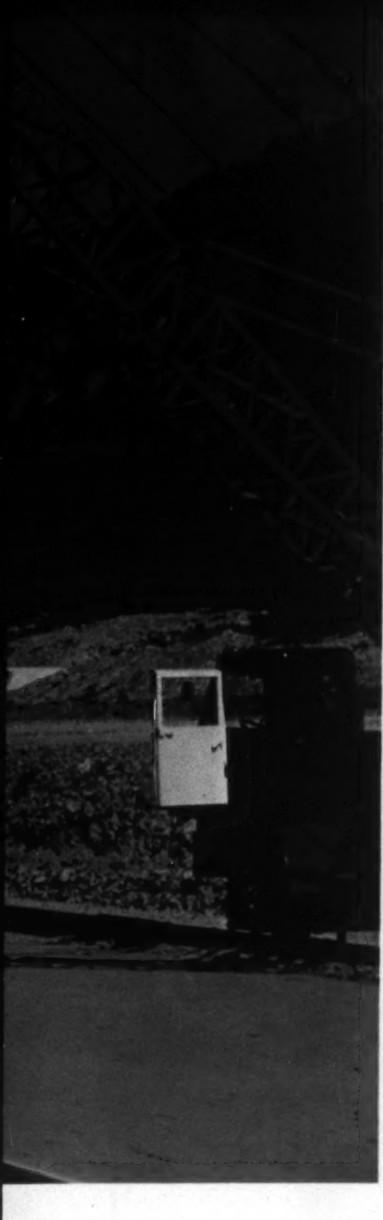
PAVING THE PENN-CAN—New entry in Pennsylvania's vast superhighway system—and part of the Interstate System—is the Penn-Can, stretching from Stroudsburg north to the New York State line. Lycoming Construction Co., contractor on this section near New Milford, Pa., used a long list of Bethlehem road steels, including reinforcing steel, bar mats, dowel units, wire rope, beam and cable guard rail with steel posts.

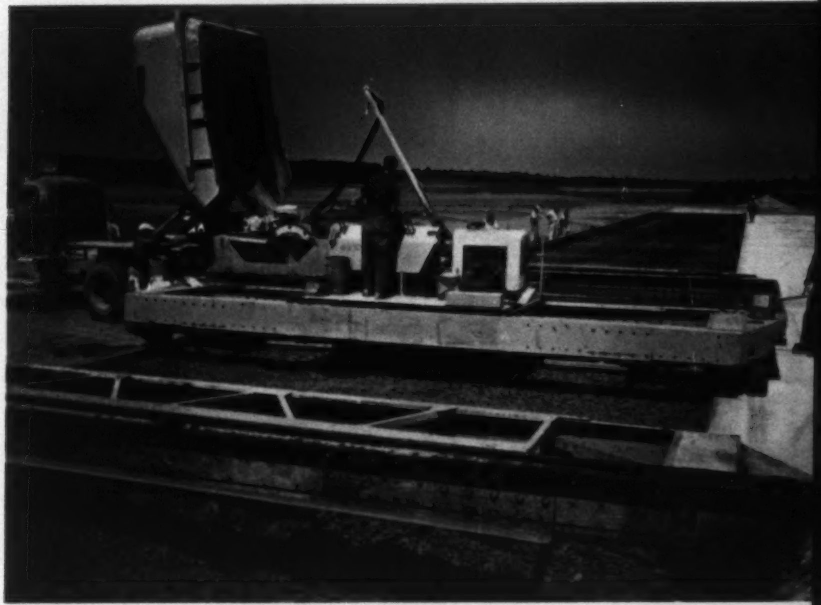
The most complete line of paving steels...

When you are in the market for highway steels, remember that besides the list of paving steels at the right, Bethlehem supplies steels for right-of-way work: hollow and solid drill steel, special analysis steels for construction equipment, culvert sheets, wire rope, etc. Bethlehem steel products for the finished highway include fabricated plates and shapes for bridges and underpasses, guard rails and posts, bridge rails, fence, and fence posts.

We've had years of experience in supplying steel for highways. We understand the road builder's problems. Our people are more than glad to talk over your job with you at any time.

BETHLEHEM STEEL

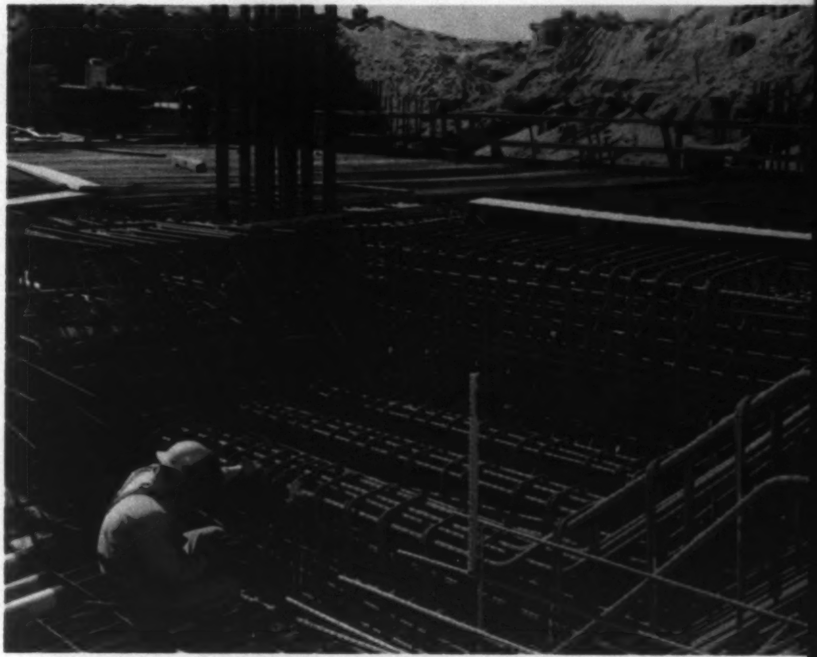




JET-AGE AIRPORT—At Dulles International Airport, Chantilly, Va., runways 10,000 to 11,500 ft long, 150 ft wide, and 12 to 15 in. thick are laid to accommodate jet aircraft. Like any heavy-duty roadbed, the concrete is interlaced with reinforcing steel for strength and with dowel units for expansion, contraction, and weight transferral between slabs. Contractor: C. J. Langenfelder & Son, Inc.

HERE'S A PARTIAL LIST:

Road-form stakes • bar mats • hinged bar mats • reinforcing for continuous paving • welded fabric • dowel units and hook-bolt center-joint dowels • trapezoidal keyways • dowels for longitudinal contraction and expansion joints • expansion hook bolts for pavement widening • center strips and pins.



MISSILE BASE—Future launching pad for one of the Atlas missile launching bases under construction near Spokane, Wash. The project manager for MacDonald-Patti-Scott-Leavell, the general contractor, commented that each pad seems to be more steel than concrete, a construction necessary to withstand the impact of an Atlas launching.

BETHLEHEM
STEEL

PRIEST RAPIDS DAM—Vast tonnages of reinforcing steel are needed for huge projects like this $98,000,000 dam on the Columbia River in Washington. Here, too, steel products such as steel sheet piling are extensively used plus wire rope, and others. Merritt-Chapman & Scott Corp. is building the project for the Grant County Public Utility District.

Do YOU Have These Publications?

Take a look at this list of Bethlehem publications on highway products, concrete construction, and allied fields. Just use the coupon below. The numbers in front of the publications also appear in the coupon. Circle those you'd like to receive.

1. Dowel Units
2. The Welding of Concrete Reinforcing Bars
3. Perfect Vision Bridge Railing
4. Beam Guard Rail
5. Non-Highway Uses of Beam Guard Rail
6. Cable Guard Rail
7. Steel Bridge Flooring
8. Yieldable Arches for Mine Roof Support
9. Rock Bolts
10. H-Piles
11. Sheet Piling
12. Abrasion-Resisting Steels
13. Rolled-Steel Curb Facing
14. Hollow Drill Steel
15. Slings and Fittings
16. Solving Drainage Problems (steel culverts)
17. Wire Rope for Construction
18. Structural Shapes
19. High-Strength Bolts
20. Stress-Relieved Strand for Prestressed Concrete
21. Form Stakes

PUBLICATIONS DEPARTMENT
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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Materials Prices

Monthly Market Quotations by ENR Field Reporters

IRON AND STEEL PRODUCTS—PER 100 LBS. BASE MILL PRICES

	STRUCT SHAPES	PLATE CARBON STEEL	REINF BARS* billet	RIVETS ½-in. structural	SHEET PILING Base	STEEL RAILS Per Net Ton Standard	STEEL RAILS Per Net Ton Light	TRACK SUPPLIES Angle Bars	TRACK SUPPLIES Std Spikes	TRACK SUPPLIES Tie Plates	TRACK SUPPLIES Track Bolts
Birmingham Area	$5.50	$5.30	$5.675	$12.25	......	$110.50	$130.00	$6.975	$9.75	$6.60	......
Chicago Area	5.50	5.30	5.675	12.25	$6.50	110.50	130.00	6.975	9.75	6.60	......
Pittsburgh Area	5.50	5.30	5.675	12.25	6.50	110.50	130.00	6.975	9.75	6.60	$14.75
Buffalo Area	5.50	5.30	5.675	12.25	6.50	110.50	130.00	6.975	9.75	6.60	14.75
Cleveland	......	......	5.675	12.25	6.50	......	......	......	......	......	14.75
Youngstown Area	......	......	5.675	......	......	......	......	......	9.75	......	......
Geneva	5.50	5.30	......	......	......	......	......	......	......	......	......
Los Angeles	6.20	......	6.375	......	6.50	......	......	......	9.75	6.875	......
Pueblo	......	......	......	......	......	......	......	$9.75	9.75	6.60	......

* Fairless Works, $5.575.

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	STRUCTURAL SHAPES Extras, New York:	REINFORCING BARS Per 100 lb., base price 5 tons to carload lot New billet	REINFORCING BARS Rail steel	REINFORCING BARS Extras, New York:	EXPANDED METAL LATHh Per 100 sq. yd., carload lots Std. diamond mesh. 3.4 lb.	EXPANDED METAL LATHh Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING Per 100 sq ft., carload lots fab mill
Atlanta	7.29–8.29EsV	Quantity extras per cwt; Item: 10,000# and over, base, 5,000—9,999#, +10¢, 2,000—4,999#, +35¢, 1,000—1,999#, +85¢, 400—999#, +$1.75, 100—399#, +$3.00, under 100#, +$4.00. Order: 20,000# and over, base, 10,000—19,999, +10¢, 5,000—9,999, +20¢, 2,000—4,999, +50¢, 1,000—1,999, +$1, 400—999, +$2, under 400, +$5.	8.75	$8.75	EXTRAS, per cwt—♦Quantity (applies to LCL shipments only): under 1,000#, +$1.80; 1000–1999#, +$1.50; 2000–4999#, +$1.30; 5000–9999#, +90¢; 10,000–19,999#, +60¢; 20,000–29,999#, +30¢; 30,000–39,999#, +10¢; 40,000# & up, none. ♦Size†: #2 +$2.80; #3 +$1.40; #4 +$1.00; #5 +70¢; #6, #7, #8, #9, #10, #11 +50¢. ♦Bending: heavy, +90¢; light +$2.20 (except in New York City and surrounding metropolitan area where bending must be done on the job). ♦Engineering (details and placing from designs by others): over 500 tons, +45¢; 200–499 tons, +50¢ but not over $4500; 75–199 tons, +65¢ but not over $2000; 20–74 tons, +75¢ but not over $975; 5–19 tons, +85¢ but not over $300; under 5 tons, +$1.00 but not over $35. Min. charge $25. Design only: +60¢.	$53.00S	$57.00S	4 × 18 in., No. 5 & 10 wires— Joliet, Ill., Donora, Pa., Monessen, Pa. ......$7.04 4 × 12 in., No. 8 & 12 wires— Joliet, Ill., Donora, Pa., Monessen, Pa. ......$2.62 6 × 6 in., No. 6 & 6 wires— Joliet, Ill., Donora, Pa., Monessen, Pa. $4.17
Baltimore	9.70		9.00T	....		44.50	49.00	
Birmingham	9.00ty		8.51–9.94tyV	8.99ty		61.00pK	67.00pK	
Boston	8.21–9.31KssV		8.75t	8.75t		49.50K	54.00K	
Chicago	7.31–7.86YsV		7.06–7.16gsV	7.06–7.16gsV		52.00‡U	63.00‡U	
Cincinnati	7.87–8.42skYsV		8.16t‡	....		44.50Kg	49.00mnKg	
Cleveland	7.74–8.29stYsV		7.14st	..		46.50KL	51.00KL	
Dallas	7.71–9.49ksV		9.00	9.00		44.00u	48.50w	
Denver	10.16cK		9.25c	....		63.00n	69.00n	
Detroit	7.87–8.57RMsVy		7.37Q	11.85Q		67.00O	74.00O	
Kansas City	9.82sT		8.10N	....		51.00	55.50	
Los Angeles #	8.90–9.55dktsV		7.35frt	....		55.00S	64.00S	
Minneapolis	7.78–8.17ysV		9.26T	9.26T		44.50K	49.00K	
Montreal	7.90–8.60iCF/8.20–8.90AiF		7.00/7.50FGi	7.00/7.50FGi		65.70h	70.20h	
New Orleans	....		8.00ghts	....		48.50K	53.50K	
New York	8.02–8.84‡sVssV		8.60tv	8.60y		52.00n	59.00**	
Philadelphia	7.85–8.40buyssV		8.23sy	8.23y		44.50‡U	55.20‡U	
Pittsburgh	7.35–7.90ysV		7.35y	....		58.50‡rw	64.50‡rw	
St. Louis	7.79–8.34stryV		7.75‡trQ	7.75‡trQ		61.00wzK	62.00wzK	
San Francisco	9.45ssV		9.85jS	....		53.00S	58.00S	
Seattle	9.45–10.25aDeV		8.85DM	....		67.00‡xD	73.50‡xD	
Toronto	9.20H		7.85	7.85		44.00gaI	38.40gJ	

*‡ Delivered ** Aver. of Canadian & American *# add 4% sales tax *a 2000–4999# *b 10,000–19,999#, fab city *c 20 tons or over *d 10,000–29,999# *e Intermediate struct'l *f Incl. delivery in free zone *g CL *h list price; dominion tax exempt; add provincial and municipal taxes *i add provincial and municipal sales taxes *j intermediate and hard grade *k fab city *l delivered: contractor to do unloading *m copper alloy *n LCL *o asphalt coated *p 500 sq. yd. or more. *q 2.5 lb *r less 2% disc. for cash *s 10,000# item in 20,000# order *t less ½% disc. 10 days *u add 10¢ switch *v incl 15¢ del. *w truck lots. *x add 2% sales tax *y add 15¢ del. *z add 10¢ del. *A American made. *C Canadian made. *D ½% for cash. *E 30,000# or over. *F Federal tax exempt for bldgs. *G add 10¢ del. *H 8.85 without tariff charges. *I 3 lb $60.00. *J 4 lb $47.50. *K less 2% disc. 10 days *L F.o.b. Youngs-own plant *M 5,000–9,999# *N 2,000–19,999# *O 100 sy lots *Q 5 tons to CL *R: revised *S less 2% disc. 10th *T less ½% disc. 10th of mo. *U less 2% disc 10 days *V varies according to type and size

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE PRICE INDEXa	ASBESTOS CEMENT PIPE Z per lin. ft. 6" Press Cl. 150	ASBESTOS CEMENT PIPE Z 12" Sew Cl. 1500	CLAY SEWER PIPE Per ft., delivered, car load ASTMC 13-55 8 in.	CLAY SEWER PIPE ASTMC 13-55 12 in.	CLAY SEWER PIPE ASTMC 200-55T 24 in.	CLAY SEWER PIPE ASTMC 200-55T 36 in.	CLAY DRAIN TILE† Per 1,000 ft., car load lots, f.o.b. ASTMC 4-55 6 in.	CLAY DRAIN TILE† 8 in.	CONCRETE SEWER PIPEb Per ft., delivered ASTMC 14-55 12 in.	CONCRETE SEWER PIPEb 24 in.
Atlanta	130.5	$1.61/1.69	$2.36/2.48	$0.55r	$1.00r	$4.50r	$12.50r	$309.00sr	$334.00r	$0.95mKr	$3.75mKr
Baltimore	140.1	1.61/1.69	2.19/2.30	.665	1.20	3.05	12.71	187.80	289.20	1.61	2.75
Birmingham	125.8	1.61/1.69	2.26/2.37	.50r	.95r	4.14rw	13.50rw	295.00rz	430.00rz	1.75rS	2.75rS
Boston	143.1	1.63/1.71	2.19/2.30	.784qrtL	1.512qrtL	6.255qrtM	.....	215.40r	330.60r	1.56S	3.47S
Chicago	139.8	1.61/1.69	2.19/2.30	.93rm	1.78rm	7.52rm	21.16rm	220.00Br	330.00Br	1.30	4.00
Cincinnati	135.5	1.63/1.71	2.19/2.30	.616rt	1.188rt	4.725rt	12.40r	270.00r	400.00r	.85rAB	3.25rAB
Cleveland	141.6	1.63/1.71	2.19/2.30	.69BCN	1.33tBC	5.13tBC	13.33tBC	155.40mBC	240.60mBC	1.35	3.60P
Dallas	137.8	1.63/1.71	2.26/2.37	.550‡B	.96‡B	4.40b‡B	9.75‡bB	....	....	1.25BD	2.85BD
Denver	144.9	1.71/1.80	2.36/2.48	.56nr	1.00nr	4.98r	.....	460.00nr	640.00nr	1.05m	3.50m
Detroit	141.9	1.61/1.71	2.19/2.30	.97nk	1.86nk	7.48nk	19.95nk	212.00mk	327.00mk	1.40k	5.23k
Kansas City	138.5	1.61/1.71	2.26/2.37	.62r	1.125r	6.324br	16.86r	315.00r	625.00r	1.60r	3.55r
Los Angeles #	148.6	1.70/1.79	2.19/2.30	.82bl	1.78blS	7.19blS	16.90blS	410.00lS	590.00lS	1.24sE	3.66fsE
Minneapolis	144.8	1.67/1.75	2.26/2.37	1.00oB	1.80oB	7.75oB	.....	....	....	3.19DFH	6.31DFH
Montreal	.....	....	....	1.13u	2.00u	7.00u	13.50u	288.00	545.00	1.17D	3.11jpD
New Orleans	132.3	1.61/1.69	2.26/2.37	.566r	1.078r	5.65r	.....	240.50pr	490.00	1.41ilR	3.76il
New York	138.5	1.63/1.71	2.19/2.30	1.01	1.94R	12.89	35.61	240.81	369.84	1.50‡B	3.60‡B
Philadelphia	137.8	1.61/1.69	2.19/2.30	.72‡	1.40‡	9.02‡s	24.68‡s	220.00‡	330.00‡	1.50‡A	4.00‡A
Pittsburgh	142.7	1.63/1.71	2.19/2.30	.94K	2.01K	8.79K	24.15K	190.00	295.00	1.66DB	3.93DB
St. Louis O	136.9	1.61/1.69	2.26/2.37	.65r	1.27r	5.10r	12.95rS	200.00r	350.00r	1.75i	4.05
San Francisco	148.6	1.70/1.79	2.19/2.30	.86‡d	1.86‡d	7.53‡d	18.00‡d	360.00‡l	620.00‡l	1.05‡Q	3.30‡Q
Seattle	149.0	1.71/1.80	2.19/2.30	.88bk	1.86kb	7.61k	.....	254.00ck	....	1.95ky	4.55ky
Toronto	.....	....	....	.80F	1.50F	6.00F	.....	185.00F	305.00F	1.27F	5.19F

***WROUGHT STEEL PIPE**
(Full standard weight)
Discount from list; see footnote

Mill	2½ & 3 in., Butt Weld* Black %	2½ & 3 in., Butt Weld* Galv. %	3½ to 6 in., Lap Weld* Black %	3½ to 6 in., Lap Weld* Galv. %
Lorain, Ohio	13.75	+3.50	+2.00f	+19.75f
Aliquippa, Pa.	13.75	+3.50	3.25a	+14.50a
Sparrows Pt., Md.	17.25	+1.00	......	......
Benwood, W. Va.	13.75	+3.50	......	......
Youngstown, O.	13.75	+3.50	3.25	+14.50a
Indiana Harbor, Ind.	13.75	+4.50	2.25ab	+15.50a
Sharon, Pa.	13.75	+3.50	3.25ab	+13.50ab
Wheatland, Pa.	13.75	+3.50	3.25a	+14.50a
Etna, Pa.	13.75	+3.50	.50ab	......
Fontana, Calif.	0.75	+15.50b	+0.75ab	+26.50ab

* Threaded and coupled. a 3½ to 4 in. b Continuous weld. c: to 1 5 and 6 in. d 6 in. e Seamless 5 in.

*† Extra quality. *‡ delivered. *# add 4% sales tax *a PRICE INDEXES for CENTRIFUGAL CAST IRON PIPE (Include carload freight allowed to city). These also serve as the HISTORICAL RECORD of THE $ PER NET TON PRICE of CLASS B, B&S, PIT CAST IRON PIPE. F.O.B. Foundry Price Indexes Birmingham, Ala., 125.8; Burlington, N. J., 134.6. For explanation of index see ENR Sept. 29, 1955 page 139. *b Extra strength. *c 4-in., $130. *d SS361-A. *f 21 in. *g culvert pipe; reinf., ASTM C 75–56. *h reinf., ASTM C 75–54. *i reinf., ASTM C 76–55. *j centrispun. *k less 2% disc. for cash. *l fob plant. *m truck del. *n LCL del., fob truck. *p less 5% disc. 10th. *p freight allowed to destination in city. *u 35,000# minimum. *r less 2% disc. 10 days. *s 1 ft lengths. *u CSA A 60. *v standard strength. *w SS; add 20% for d.s. *x fob city. *y Reinforced. *z Upper value in range based on both truck lots and less than truck lots, fob city; lower value truck lots delivered. *A single strength. *B truckload. *C less 2% disc. 15th. *D ASTM 76–57. *E less 1% disc. 10 days. *F less 2% disc. 30 days. *G LCL *H CL. *i fob origin, freight allowed. *I reinf. B14–15. *K Less 2% disc. 15 days. *L ASTM 13–57. *M ASTM 200–57. *N 2 ft lengths. Trucklots. *O add 2% Sales Tax. *P 15 in. *Q less 1% disc. 10th. *S ASTMC 72, 12" 1.55, 24" 4.00.

* **WROUGHT STEEL PIPE:** Deduct discounts shown above from the following standard list consumers carload prices to get mill price. List prices per ft.(*based on approx. $200 per net ton): Butt Weld ⅛ in., 5½¢; ¼ in., 6¢; ⅜ in., 6¢; ½ in., 8½¢; ¾ in., 11½¢; 1 in., 17¢; 1¼ in., 23¢; 1½ in., 27½¢; 2 in., 37¢; 2½ in., 58½¢; 3 in., 76½¢. Lap Weld 3½ in., 92¢; 4 in., $1.09; 5 in., $1.48; 6 in., $1.92. continuous weld same as lap weld prices. Add freight, 3% transport tax for destination price. † Production discontinued November 1957

WROUGHT IRON PIPE: List prices per ft. same as for wrought steelpipe, but add following "discounts" to get Pittsburgh mill price: Butt Weld—1 in. black, + 65.54, galv., + 95.77; 1¼ in. black, + 65.54, galv. + 95.23, 1½ in. black, + 61.78 galv. + 91.22; Lap Weld—2½ in. to 3 in. black + 67.95 galv. + 95.77; 4½ in. to 6 in. black + 64.74 galv. + 90.68 Add freight rates plus 3% transportation tax to get destination price.

See following ENR issues for OTHER PRICES:

- Wood Products, Glass, Explosives, Chemicals: Last, Mar. 24; Next, Apr. 21
- Clay Products, Lime, Plaster, Paint, Roofing: Last, Mar. 31; Next, Apr. 28
- Wage Rates, Building Board, Lath, Insulation: Last, Mar. 31; Next, Apr. 28
- Cement, Aggregate, Ready Mixed Concrete, Asphalt: Last, Apr. 7; Next, May 5

CONCRETE PERFORMANCE REPORT:

POZZOLITH concrete used in the Tri-Dam Project to meet full range of engineering requirements for all types of concrete specified... saves $86,000 in costs of concrete alone

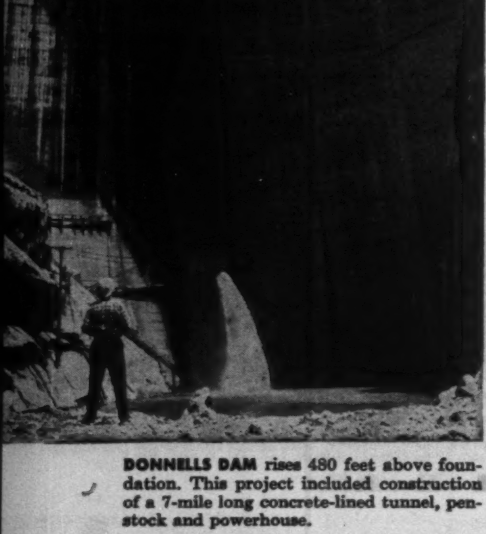
TRI-DAM

The Tri-Dam Project in south-central California is one of the most interesting hydraulic programs undertaken in recent years. Each of the three structures represents a different basic type of dam being constructed in North America today.

Donnells Dam is a graceful concrete arch. Tulloch Dam is a concrete gravity structure and Beardsley Dam a rolled earth fill dam with a concrete spillway.

Though these three dams were designed to provide year-round irrigation for two agricultural districts, the $52,000,000 in bonds required to finance construction is secured solely by future revenues from the sale of the 84,000 kilowatts generated by the three powerhouses.

Over 515,000 cubic yards of concrete were used in the Tri-Dam Project for tunnels, powerhouses and the dams themselves. POZZOLITH was employed in all concrete except for a small quantity placed during the first few months of construction.



DONNELLS DAM rises 480 feet above foundation. This project included construction of a 7-mile long concrete-lined tunnel, penstock and powerhouse.

Evaluation tests—Shortly after the project began, laboratory tests were made to determine the quality and economy of concrete produced with POZZOLITH using the cement and aggregate already in use on the project. These tests revealed that mixes made with POZZOLITH Retarder would lower the rate of temperature rise in the mass concrete, reduce the total heat evolved and would provide other basic improvements in quality. Tests also showed that substantial savings would be realized in the cost of concrete.

Field trials with these mixes followed. Careful attention was paid to aggregate coating and workability of the fresh concrete and to strength development under job conditions. The excellent results achieved in the laboratory were repeated in the field, and it was decided to employ POZZOLITH in all concrete at Tri-Dam.

The Beardsley Project—The dam is a rolled earth fill structure 1000 ft. long and 280 ft. high with a concrete spillway. Although the volume of concrete placed at Beardsley was small compared to the other two dams, it provided an opportunity to carefully study the economic advantages obtained with POZZOLITH.

Concreting at Beardsley had been underway several months before the use of POZZOLITH was adopted. During this period some 16,400 cubic yards of plain concrete were placed. Subsequently, 21,700 cubic yards of concrete with POZZOLITH were employed for the spillway, penstock and powerhouse. The POZZOLITH mix had the same slump and water-cement ratio as the plain concrete but required a lower water and cement content to achieve the same strength. The net saving was about $2000 after allowing for cost of the additional aggregate required to maintain the same yield.

The Tulloch Project—Tulloch Dam is a concrete gravity structure, 1600 feet in length, having a maximum height of 200 feet. Most of the 240,000 cubic yards of concrete employed at Tulloch was batched out of a job-site plant.

Though control of heat evolution was desired even during cold weather, it was felt that slow strength gain at early ages might result from the use of a retarder at low temperatures. Laboratory and field tests quickly indicated, however, that with POZZOLITH Retarder, retardation occurred only during the first few hours after placement and one-day strengths equaled those obtained with a non-retarded mix at the same temperature.

The Donnells Project—The dam is a concrete arch rising 484 feet above its bedrock foundation. Crest length is 960 feet. The spillway structure adjoins the dam on the left abutment.

Approximately 230,000 cubic yards of concrete were used in Donnells Dam and related structures. With POZZOLITH Retarder, 364 lbs. of Type II cement per cubic yard and 6% entrained air, test cylinders averaged 4,000 psi at 28 days.

To hold the temperature of mass concrete at approximately 45°F at the

TULLOCH DAM stretches nearly 1/3 of a mile across the Stanislaus River. Here POZZOLITH Retarder proved particularly beneficial in mass concrete during summer months when the temperature soared up to 110°F.

TRI-DAM FACILITY is jointly owned and operated by the Oakdale and the South San Joaquin Irrigation Districts, California. Design Engineers: George T. Goodall Co. & International Engineering Co., Inc. • Project Engineers: Tudor-Goodenough Engineers • Contractors: Donnells Dam and Beardsley Dam—Tri-Dam Contractors (a joint venture by Morrison-Knudsen Co., Peter Kiewit Son's Co., Macco Corp., and Stolte, Inc.); Tulloch Dam—The Arundel Corp. and L. E. Dixon Co.

PROJECT

time of placement, the temperature of concrete materials was carefully controlled. During hot weather this was accomplished by circulating cold air through the aggregate bins and obtaining batch water from a cold mountain stream. When the ambient temperature dropped below 35°F, the mixing water was heated and steam was used to warm the sand. In this manner the desired 45° placing temperature was maintained within close limitations.

Extreme temperature variations—variety of mixes—Concrete work at Tri-Dam extended through all seasons with temperatures ranging from 110°F during the summer to below freezing at night in winter months. A large variety of concrete mixes, mixing methods and placing procedures were employed. Maximum aggregate sizes of these mixes ranged from ¾ inch up to 6 inches and design strengths ranged from 2,000 to 3,000 psi at 28 days.

POZZOLITH and Master Builders field service—The POZZOLITH used in 499,715 cubic yards of concrete in the Tri-Dam Project effectively aided the placing operation in all situations encountered. With the POZZOLITH Retarder mix, heat generated in mass concrete was reduced and carefully controlled and strength requirements were met . . . all with substantial savings in cost of concrete. The net saving averaged $0.172 per cubic yard . . . a significant saving of $86,000.

Throughout the project, Master Builders field men assisted in solving on-the-job problems . . . adding their experience and product know-how to the technical talents and experience of Tri-Dam Project engineers, contractors and concrete suppliers. Result: uniform, better quality concrete at lowest cost in place.

To better meet concreting requirements on your current and future projects—call in the local Master Builders field man. At no cost, he'll demonstrate—with your materials—that POZZOLITH will produce improved concrete . . . superior in performance, in quality and in economy.

BEARDSLEY DAM—an earth fill dam with concrete spillway. Work here demonstrated the lower cost in place of POZZOLITH concrete.

The Master Builders Company, Cleveland, Ohio • Division of American-Marietta Company
The Master Builders Company, Ltd., Toronto, Ontario
Represented in foreign countries by:
Master Builders International, Nassau, Bahamas • Division of American-Marietta, C.A.
Branch Offices in all principal cities.

Our 50th Year

MASTER BUILDERS®
POZZOLITH*

*POZZOLITH *is a registered trademark of The Master Builders Co. for its concrete admixture to reduce water and control entrainment of air and rate of hardening.*

Construction Reports

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, MARIE MORAVSIK, ELAINE CHOMYAK, ELIZABETH WERRA, ELEANOR QUERET, Reports,
J. H. WEBBER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
April 20 Rhode Island   April 25 Connecticut

BUILDINGS—BA

▲ **Mass., Framingham**—INFIRMARY—BA 4/20—Congregation of the Sisters of St. Joseph of Boston, Chancery Office, 1 Lake St., Brighton, Mass. (selected list of bidders), Bethany Convent Infirmary, Bethany Rd. $1,500,000. Maginnis & Walsh & Kennedy, 126 Newbury St., Boston, archts. CD 4/15/59.

▲ **Mass., Boston** — SCHOOL — BA 4/21 — Dpt. School Bldgs., 26 Norman St., elementary school, South End Dwight Dist., Worcester St. $1,000,000. John M. Gray Co., 153 Milk St., archt. CD 3/29, under LB.

▲† **Me., Topsham**—HOUSING—BA 5/4—Base Procurement Office, Topsham Air Force Station, Brunswick, 177 units Capehart Housing, Topsham Air Force Station, Inv. No. 17-612-60-2. $2,900,000. Extended date. Kelley & Gruzen, 10 Columbus Circle, New York, N. Y., archts.-engrs. CD 3/25.

▲† **Mass., Ayer**—HOUSING—BA On Or About 5/24—U. S. Eng., 562 Congress St., Portland, Me., 1,200 units Capehart Family Housing, Fort Devens, ENG-19-016-60-39. $18,000,000-$19,000,000. Plans deposit $10. CD 11/17.

HEAVY CONSTRUCTION—LB & CA

▲† **Gil Wyner Co., Inc.**, 12 Newland St., Malden, Mass., CA **$1,124,422**, Westville Dam; Quinebaug River, Thames River Basin, Southbridge and Sturbridge, CIVENG-19-16-60-27, MASSACHUSETTS. U. S. Eng., 424 Trapelo Rd., Waltham 54, Mass. Bids Mar. 15. CD 3/17, under LB.

▲ **White Oak Excavators, Inc.**, 61 East Main St., Plainville, Conn., CA **$1,047,746**, pressure conduit, storm drain and sanitary sewer under N. Y., N. H. & H. R. R., Ledyard St., Airport Rd. and South Meadows, 1½ mi., HARTFORD, CONN. Metropolitan Dist. Bd. Contract & Supply, 115 Broad St., Hartford, Conn. Bids Mar. 3. CD 3/9, under LB.

BUILDINGS—LB & CA

Agostini Constr. Co. Inc., 70 Bacon St., Pawtucket, R. I., LB **$859,721**, JUNIOR-HIGH SCHOOL, off Amvet Blvd., NORTH ATTLEBORO, MASS. Town, Supt. Schools, 45 South Washington St., North Attleboro, Mass. Bids Mar. 31. CD 3/4.

▲ **John Capobiunco**, 101 Tremont St., Boston, Mass., LB **$3,698,000**, North SENIOR HIGH SCHOOL and VOCATIONAL SCHOOL, Commercial St., East Weymouth, WEYMOUTH, MASS. Town, 111 Middle St., East Weymouth, Mass. Bids Apr. 1. CD 3/9.

▲ **Associated Constr. Co.**, 1010 Wethersfield Ave., Hartford, Conn., CA **$2,772,000**, E. C. Goodwin Regional Vocational Technical SCHOOL, HARTFORD, CONN. State P. Wks. Dpt., 165 Capitol Ave., Hartford, Conn. Bids Mar. 9. CD 3/11, under LB.

Jarvis Realty Co., 283 E. Center St., Manchester, Conn., Owner Builds, **$910,000**, 65 HOUSES "Oakdale" Oak St., SOUTH MANCHESTER, CONN. CD 5/7/58.

▲ **Red Rock Development Corp.**, Church St., Newington, Conn., Owner Builds, **$1,210,000**, 121 HOUSES, Church St., NEWINGTON, CONN.

▲ **Housatonic Development Corp.**, 2742 Main St., Stratford, Conn., Owner Builds, **$1,000,000**, 100 HOUSES, Brookside Park, WALLINGFORD, CONN. CD 5/7/58.

▲ **James W. Roddy**, 1414 Hopmeadow St., Simsbury, Conn., Owner Builds, **$1,200,000**, 40 HOUSES Nob Hill Farm, West Mountain Rd., WEST SIMSBURY, CONN.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
May 6 Pennsylvania
STREETS AND ROADS
April 19 Maryland   May 6 Pennsylvania

▲ **N. Y., Rochester**—BA 5/4—City, Purchasing Agent, Rm. 36, City Hall, No. 20 South Fitzhugh St., Zone 14, Charlotte-Hopper Hollow Project trunk sewers and force main: Div. "E", hopper hollow trunk sewer; Div. "F", Beach Avenue trunk sewer; Div. "G", Genesee River crossing; Div. "H", Irondequoit force main. Plans deposit $75. Nussbaumer, Clarke & Velzy, 327 Franklin St., Buffalo, Zone 2, and 500 Fifth Ave., New York, Zone 36, engrs. CD 3/20/56.

BUILDINGS—BA

▲ **N. Y., Brooklyn**—SCHOOL—BA 4/28—Supt. Design, Constr. & Physical Plant, Bureau Constr., 4th Fl., 42-15 Crescent St., Long Island City, Zone 1, general constr., plumbing and drainage (incl. heavy kitchen equip.) heating and ventilating, electrical work and lighting fixtures for modernization and conversion of existing P. S. 196, Bushwick Ave. and Scholes St., Brooklyn Boro. Plans deposit $25 general, $10 each mechanical trades. CD 1/25.

▲ **N. J., New Brunswick**—DINING HALL—BA 5/3—Douglass College of Rutgers University, Queens Bldg., 12 College Ave., dining hall on campus of Douglass College, $1,000,000. Perry, Shaw, Hepburn & Dean, 955 Park Sq. Bldg., Boston, Mass., archts. CD 4/29/59.

▲ **N. Y., Albany**—MAIN BLDG., No. 5—BA 5/4—State Dpt. P. Wks., State Office Bldg., Albany 1, general contract, heating, sanitary, electric, elevator and moving stairway work for Bldg. No. 5, Department Public Works on behalf of N. Y. State Employees' Retirement System. $5,000,000. Plans deposit $50 general, $40 each, heating and electric, $30 for moving stairway, $20 each, sanitary, elevator. CD 1/15.

BUILDINGS—SLC

▲ **N. J., Princeton** — JUNIOR FACULTY HOUSING — Princeton University, soon lets contract 1st unit 8 story, 37 x 400 ft. Junior Faculty Housing, $1,750,000. Ballard, Todd & Snibbe, 123 E. 77 St., New York, N. Y., archts. Froioli-Blum & Yesselman, 250 E. 43 St., New York, N. Y., engrs. (Correction—bid date). CD 3/30.

HEAVY CONSTRUCTION—LB & CA

▲† **Ambrose-Augusterfer Corp.**, 247 E. Ashmead St., Phila., Pa., CA **$2,389,000**, installation central air conditioning U. S. Post Office (Main), PHILA., PA. General Services Admin., 250 Hudson St., New York, N. Y., Bids Feb. 18. CD 2/23, under LB.

Limbach Co., 521 Pressley St., Pittsburgh 12, Pa., CA **$917,000**, (9 bidders), installation central air conditioning U. S. Post Office & Courthouse, PITTSBURGH, PA. General Services Admin., Business Service Center, Region 2, 250 Hudson St., New York 13, N. Y.

▲ **Empire Constr. Co.**, 31 S. Calvert St., Baltimore, Md., LB **$1,908,666**, (12 bidders), rehabilitation of bulkhead and related work at Harbor Field, Contr. MPA E 60-1, BALTIMORE, MD. Maryland Port Authority, Pier 2, Pratt St., Baltimore, Md. Bids Apr. 6. CD 3/31.

BUILDINGS—LB & CA

▲ **Webb & Knapp Constr. Corp.**, 383 Madison Ave., New York, 17, N. Y., CA Est. **$20,000,000**, three 38 story APARTMENTS, W. 67th to 70th Sts., West End Ave. and Hudson River, NEW YORK, N. Y. Webb & Knapp Lincoln Square Corp., 383 Madison Ave., New York 17, N. Y. S. J. Kessler & Sons, 598 Madison Ave., New York 22, N. Y., archts.

▲ **Sovereign Constr. Co., Ltd.**, 1325 Seventeenth St., Fort Lee, N. J., LB **$1,161,998**, (14 bidders), general contract HEALTH and PHYSICAL EDUCATION BLDG., State University College of Education, ONEONTA, N. Y. State Dpt. P. Wks., State Office Bldg., Albany, N. Y. Bids Mar. 30, CD 3/27/57.

▲ **M. G. Lane & Benj Kaminsky**, 808 Fair Lawn Ave., Fair Lawn, N. J., Owner Builds, **$1,500,000**, 40 HOUSES, Jane Dr., ENGLEWOOD, N. J.

▲ **Louis Goodman**, 294 Seneca Place, Westfield, N. J., Owner Builds, **$1,000,000**, 31 HOUSES on streets off Greenwood Dr. MILLINGTON, N. J.

▲ **U. S. Home & Development Corp.**, 23 Neil Ave., Lakewood, N. J., Owner Builds, **$3,000,000**, 250 HOUSES, streets off Garden State Parkway, Howell Twp., POINT PLEASANT, N. J.

L-D Building Co., Box 472, Latrobe, Pa., CA **$942,941**, general contract Secondary SCHOOL for Freeport Area Joint School Bl., Proj. 819-575, FREEPORT, PA., Pa. Public School Bldg. Auth., 101 S. 25 St., Harrisburg, Pa., Bids Feb. 18 CD 2/25, under LB.

▲ **Wigton Abbott Corp.**, 1225 South Ave., Plainfield, N. J., CA **$3,000,000**, 152,000 sq. ft. RESEARCH and CENTER near PHILA., PA. Scott Paper Co., foot of Market St., Phila. Pa.

▲ **Ritter Brothers, Inc.**, 1511 No. Cameron St., Harrisburg, Pa., CA **$3,525,648**, JUNIOR-SENIOR HIGH SCHOOL, TYRONE, PA. Tyrone Joint School Dist., Tyrone Pa. Hunter, Campbell & Rea, 3601 5 Ave., Altoona, Pa., archts. CD 10/27.

▲ **John H. Wickersham**, Lancaster, Pa., LB **$1,747,500**, general contract HIGH SCHOOL, WAYNESBORO, PA. Waynesboro Area School System Auth., Fairview. Elementary Bldg., Waynesboro, Pa. Bids Mar. 24, CD 3/8.

▲ **Joseph F. Nebel Co.**, 3408 Wisconsin Ave. N. W., Wash., D. C., LB **$2,106,000**, (6 bidders), 6 story, concrete, steel OFFICE BLDG., 2121 Wisconsin Ave. N. W., WASH., D. C. Sperry-Rand Co., (Remington Rand Corp.), 315 4th Ave., New York, N. Y. Bids Mar. 31. CD 3/4.

▲ **Frank H. Wilson Constr. Co.**, 125 Coulter Ave., Ardmore, Pa., LB **$2,338,000**, DORMITORY, DINING and KITCHEN FACILITIES, University of Delaware, NEWARK, DEL. University of Delaware, Newark, Del. Bids Apr. 5. CD 3/16.

▲ **Rupert Constr. Co.**, 3400 Lancaster Ave., Wilmington, Del., LB **$1,006,803**, (6 bidders), Ninth Ward Elementary SCHOOL, Eighteenth and West Sts., WILMINGTON, DEL. Bd. Educ., 511 W. 8 St., Wilmington, Del. Bids Mar. 31 CD 3/24.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
April 19 South Carolina
STREETS AND ROADS
April 19 South Carolina, West Virginia
April 20, Louisiana, Virginia

† **Mississippi**—BA 5/3—U.S. Eng., P.O. Box 60, Vicksburg, constr. approx. 47,000 squares asphalt upper bank paving; 42,000 tons riprap upper bank paving, etc. on banks of Mississippi River between Miles 567 and 230 AHP. $500,000-$1,000,000. CD 4/27/44, under Illinois-Louisiana.

▲ **Ala., Birmingham**—TERMINAL—BA 5/10—City, City Hall, 90,000 sq. ft. terminal, air conditioning restaurant, etc., Municipal Airport. $1,000,000. Plans deposit $25. Charles McCauley, 1927 5th Ave. S., archt. Rader & Assocs., First National Bank Bldg., Miami, Fla., engrs. CD 2/19.

BUILDINGS—BA

▲† **Ala., Anniston**—AMMUNITION STORAGE AUXILIARY FACILITIES—BA 4/26—U. S. Eng., 2301 Grant St., Mobile, ammunition storage auxiliary facilities, Anniston Ordnance Depot, ENG-076-60-49. $2,000,000. Extended date. CD 3/22.

Ga., Columbus—SCHOOL—BA 4/26—Muscogee Bd. Educ., 1200 Bradley Dr., 72,000 sq. ft. Clubview Junior High School. $800,000. Plans deposit $25. Biggers, Scarbrough & Neal, 1353 13 Ave., archts. CD 10/22.

▲† **Fla., Milton**—HOUSING—BA 5/5—Dist. P. Wks. Office, Sixth Naval Dist., Bldg. No. 13, U. S. Naval Base, Charleston, S. C., 229 single concrete masonry brick panels and wood siding, on slab on-grade with interior wood stud partitions, built-up roofing on wood sheeting, aluminum foil and batt insulation, aluminum windows and screens, aluminum-frame sliding doors, hardwood veneered flush doors and screened and jalousie

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PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $53,000; other public works $88,000; Industrial buildings $110,000; other buildings $400,000. Also Foreign projects of $1,000,000 and more in size of Interest to American contractors.

By Regions & Classes of Construction
(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED
New England
Middle Atlantic
South
Middle West
West of Mississippi
Far West

PROPOSED WORK
Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Public Buildings
Mass Housing
Commercial Buildings
Industrial Buildings
Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.

BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported n low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

doors dwelling units, N. S. Naval Auxiliary Air Station, Whiting Field, NBy (CH) 29151, Spec. 29151/60. Plans deposit $50. CD 9/30.

▲ **N. C., Henderson**—PLANT—BA 5/15—J. P. Taylor Tobacco Co., 201 S. 3rd St., Richmond, Va., tobacco processing plant, $1,500,000. CD 4/1.

HEAVY CONSTRUCTION—LB & CA

▲ **VIRGINIA**—State Hy. Dpt., 1221 E. Broad St., Richmond,

Va.—**Nello L. Teer Co., Inc.**, Trust Bldg., Durham, N. C., and **Bowers Constr. Co.**, 805 W. S St., Raleigh, N. C., CA **$11,068,027**, grading, and drainage from Jones Point Bridge over Potomac River to project under construction near R. F. & P. R. with 2.5 mi. pavement from Jones Point Bridge to Rte. 241 Incl. 6 bridge with interchange at Hunting Creek and U. S. Rte. 1, on overpass of Mount Vernon Memorial Highway and 7 major concrete culverts on roadway Proj. 0413-100 071-C1, B1, B2, B3, B4, B5, B6, B12, 0413-029-002-C3, C45, C51, C55, C78, C81, 0413-029-002, G1, B48, B49, G2, Fed. I-495-4 (2) 184 I-495-4 (6) I (179) City of Alexandria and Fairfax Co.;

Va.—**Albert Bros., Contractors, Inc.**, Salem, Va., CA **$2,231,354**, grading, drainage from 0.69 mi. north of Rte. 626 to 0.84 mi. north of Buchanan, necessary service roads and connections bypassing Buchanan, Proj. 0081-011-008 B1 Fed. I-812 (30) 164 Contract 1, Interstate Rte. 81, Botetourt Co.;

Va.—**Haynes Constr. Co., Inc.**, Bluefield, W. Va., CA **$1,942,807**, grading, draining necessary service roads and connections from 0.8 mi. east of Rte. 851 to 0.18 mi. west of Rte. 645 at Seven Mile Ford bypassing Chilhowie, Interstate Rte. 81, Washington and Smyth Counties;

Va.—**Unaka Paving Co.**, Johnson City, Tenn., CA **$551,654**, divided b. conc. 2.54 mi. E. and W. of new Rte. 99 to complete the interstate constr. between Newbern and U. S. 11 west of Rte. 100. Proj. 9981-077-010-P1 Fed. I-81-1 (31) 95, Pulaski Co. Grand total **$15,793 842**. Bids Mar. 23, awarded Apr. 1. CD 3/25, under LB.

▲ **VIRGINIA**—State Hy. Dpt., 1221 E. Broad St., Richmond,

Va.—**Talbott-Marks & Runions Co., Inc.**, Clarksville, Va., CA **$1,202,721**, 6 bridges between Telegraph Rd. and R. F. and P. R. R., incl. twin structures at railroad and present Rte. 613 single spans to take Bush Hall Dr. and Innean St. over Circumferential and 1 span where the circumferential will go over relocated Rte. 613 at interchange Proj. 0413-029-002-B14, B15, B17, B18, B19, Fed. I.IG 395-4 (6) 179 Fairfax Co.;

Va.—**T. A. Loving & Co., Inc.**, Goldsboro, N. C., CA **$1,174,688**, 5 twin bridges Buchanan bypass incl. set at an interchange U. S. 1 north of Buchanan, another set over C. & O. R. R. and Rte. 43, and set each over Secondary Rte. 625 and 628, Proj. 0091-011-008, B5, B4, B7, B8, B26, B28, B29, B30, Fed. I-UB-81-2 (3) 164, Botetourt Co. Bids Mar. 23. CD 3/25, under LB.

† **Harrison Constr. Co.**, Alco, Tenn., CA **$960,373** diversion tunnel for Flannagan Dam, VIRGINIA. U. S. Eng., 502 8 St., Huntington 1, W. Va. Bids Jan. 20 CD 1/26, under LB.

▲ **NORTH CAROLINA**—State Hy. Comn., Raleigh,

N. C.—**Asheville Contg. Co.**, London Rd., Biltmore, N. C. and **Davis Contractors, Inc.**, Mocksville, N. C. CA **$826,484**, grading, CABC, BST, b. conc. binder and surf. 8.66 mi. relocating US 421 from point on US 601 approx. 1.07 mi. south of Yadkinville, easterly to point approx. 3,000 ft. west of Forsyth Co. line and connection to existing US 421 at end of Proj. 8.17942, 8.28556, SF 172(107) S-1301 (1) Yadkin Co.;

N. C.—**C. C. Mangum**, 3016 Hillsboro St., Raleigh, N. C., CA **$792,393**, grading 7.37 mi. Interstate Rte. 95 from point just south of US Rte. 158, north to Virginia State Line, Proj. 811709. I-95-3 (3)174, Halifax and Northampton Counties;

N. C.—**Dillard Constr. Co.**, Sylva, N. C., CA **$516,713**, grading, CABC, b. conc. binder, surf., structures 2.335 mi. relocating NC 273 from Catawba St., Belmont north to point on NC 273 near Mt. Holly, Proj. 8.16303, US 1224(2) S-1224(1) Gaston Co.;

N. C.—**G. C. Tate Constr. Co.**, Hy. 29N, Concord, N. C. and **Mid-State Contractors, Inc.**, 1028 1st Ave. SW, Hickory N. C., CA **$1,697,551**, fine grading, CABC, b. conc. binder, surf. 9.14 mi. Interstate Rte. 85 between South Carolina State line and point south of Kings Mountain, Proj. 8.18267, I-85-1(11) Cleveland and Gaston Counties. Grand Total $3,833,141. Bids Mar. 29, awarded Apr. 1. CD 4/1.

▲ **SOUTH CAROLINA**—State Hy. Dpt., Hotel Columbia, Columbia,

S. C.—**Blythe Bros. Co.**, P.O. Box 989, Charlotte, N. C., CA **$2,652,965**, S.C. Dockets Nos. 23.405 1 23.459, Parts 1 and 2 and 42.521 F.A. Projects Nos. IN-185-2 (15) I-85-2 (5) Parts 1 and 2 and I-85-2 (9), Greensville and Spartanburg Counties;

S. C.—**Dickerson, Inc.**, P.O. Box 448, Monroe, N. C., CA **$1,044,920**, S.C. Dockets Nos. 32.429, 32.429, Parts 1, 2 and 3 and 40.509 F.A. Projects Nos. I-IN-26 2 (4) IN 26-3 (1) I-26 3 (6) and I-IG-IN-ING-126 (36) Lexington and Richland Counties. Bids Mar. 15. CD 3/22, under LB.

▲ **Harrison Constr. Co.**, Alcoa, Tenn., CA **$1,500,000** power house, Chattahoochee River, Columbus, GEORGIA. Georgia Power Co., P.O. Box 1719, Atlanta, Ga. CD 4/14/59.

▲† **Empire Gas Engineering Co.**, 1958 Monroe Dr. N.E., Atlanta, Ga., LB **$1,480,000**, OLF Bravo which includes complete outlying landing field, satellite field for auxiliary air station, incl. 6,500 ft. runway, connecting taxiway, parking apron, etc. U.S. Naval Auxiliary Station, NBy 25463, MERIDIAN, MISS. Dist. P. Wks. Office, Sixth Naval Dist., Bldg. No. 13, U.S. Naval Base, Charleston, S. C. Bids Mar. 30. CD 3/2.

BUILDINGS—LB & CA

Trammell Constr. Co., Inc., Bristol, Va., CA **$850,000**, SHOPPING CENTER, BRISTOL, VA. Southside Shopping Center, Inc., Bland St., Bristol, Va. CD 4/4.

▲ **Marumsco Sales Corp.**, Woodbridge, Va., Owner Builds, **$3,000,000**, Marumsco Plaza SHOPPING CENTER, WOODBRIDGE, VA. M. M. Witenstein, 18 West Montgomery Ave., Rockville, Md., planner.

McDevitt & Street Co., Builders Bldg., Charlotte, N. C., LB **$993,000** (17 bidders), ACADEMIC and UTILITY STRUCTURES, LAURINBURG, N. C. Consolidated Presbyterian College, Inc., Laurinburg, N. C. Bids Mar. 29. CD 3/1.

▲ **Justice-Thomas, Inc.**, Fred Justice, pres., Siler City, N. C., Day Labor, **$1,200,000**, 100 RESIDENCES, RALEIGH, N. C.

▲ **George W. Kane Constr. Co.**, Jefferson Standard Bldg., Greensboro, N. C., LB **$1,085,854**, 65,000 sq. ft. LIFE SCIENCE BLDG., Reynolda, WINSTON-SALEM, N. C. Wake Forest College, Reynolda, N. C. Bids Mar. 16. CD 3/8.

Leslie & Shaw, 320 Buncombe St., Greenville, S. C., Day Labor, **$850,000**, 50 RESIDENCES, Orchard Acres Subdivision, GREENVILLE, S. C.

Young Constr. Co., P.O. Box 898, Rock Hill, S. C., CA **$918,850**, 67,000 sq. ft. SCIENCE BLDG., ROCK HILL, S. C. Winthrop College, Rock Hill, S. C. Bids Mar. 31. CD 3/9.

▲ **Arkin Constr., Inc.**, 1827 Purdy Ave., Miami Beach, Fla., CA **$1,000,000**, 100-bed Osteopathic HOSPITAL, N.E. 167 St. and 18 Ave., NORTH MIAMI BEACH, FLA. Biscayne Osteopathic Hospital, Inc., c/o Smith & Korach, archts., 1630 Lenox Ave., Miami, Fla. CD 3/15.

▲ **P. J., Callaghan & Sons**, 2526 22 St. N., St. Petersburg, Fla., CA **$2,000,000**, four 252 unit Cooperative APARTMENT, STORES, 34 St. and 58 Ave. South, ST. PETERSBURG, FLA. Southgate Towers Coop. Apartment Corp., c/o O. C. R. Stagbord, archt., 5705 Tangerine Ave. South, Gulport, Fla. CD 3/24.

▲ **G. W. Hallmark & Sons, Inc.**, 3212 6 Ave. S., Birmingham, Ala., CA **$1,000,000**, 3 story, glass, steel, concrete OFFICE, First Ave. and 21 St. N., BIRMINGHAM, ALA. First Federal Savings & Loan Assn., 116 N. 21 St., Birmingham, Ala. Charles McCauley, 1927 5 Ave. S., Birmingham, Ala., archt. Awarded Apr. 1. CD 11/13.

J. E. Staub & Co., Fulton, Miss., CA **$943,285**, general contract MANUFACTURING PLANT, GREENWOOD, MISS. Bd. Suprvs. LeFlore Co., Court House, Greenwood, Miss. Baldwin Piano Co., 1801 Gilbert St., Cincinnati 2, O., lessee. Bids Mar. 22. CD 4/4, under LB.

▲ **Huber, Hunt & Nichols, Inc.**, 2450 Stibbs Ave., Indianapolis, Ind., CA **$3,000,000**, 274,000 sq. ft. glass superstructure PLANT addn., NASHVILLE, TENN. Ford Motor Co., American Rd., Dearborn, Mich. Giffels & Rossetti, Marquette Bldg., Detroit, Mich., engrs. CD 10/9.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

April 19 Illinois	**April 26 Ohio**

STREETS AND ROADS

April 19 Illinois	**April 26 Ohio**

April 27 Michigan

BUILDINGS—BA

▲ **Ind., Danville**—HOSPITAL—BA 4/25—Comrs., Hendricks Co., Courthouse, 65-bed hospital, 1 mi. east on U. S. 36 $2,200,000. CD 8/18/58.

▲ **O., Cleveland**—SCHOOL—BA 4/26—Cleveland Institute of Music, 3411 Euclid Ave., Zone 15, (selected list of bidders), school, $1,000,000. Schafer, Flynn & Williams, 1740 E. 12th St., Zone 14, archts. CD 2/23.

▲ **Ind., Valparaiso**—DORMITORY—BA 4/27—Valparaiso University, 651 College Ave., girls' dormitory, $1,330,000. Charles Stade & Assocs., 819 Busse Hy., Park Ridge, Ill., archts. CD 1/14/59.

▲ **O., Maumee**—HIGH SCHOOL—BA 4/29—Bd. Educ., high school, Gibbs and Sackett Sts. Plans deposit $35. Buehrer & Stough, 1931 Sylvania Ave., Toledo, archts. CD 11/10.

▲ **O., Cincinnati**—HOUSING—BA 5/17—Cincinnati Metropolitan Housing Authority, 595 Armory St., housing. $3,900,000. Plans deposit $40. CD 3/14.

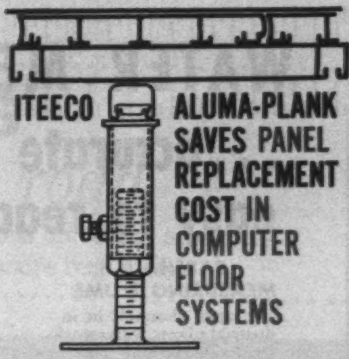
BUILDINGS—SLC

▲ **Ill., Chicago**—HOSPITAL—Rest Haven Rehabilitation Hospital, 1409 S. California Ave., soon lets contract hospital addn. $1,000,000. A. Epstein & Sons, 2011 Pershing Rd., archts. CD 2/1.

HEAVY CONSTRUCTION—LB & CA

▲ **Frazier-Davis Constr. Co.**, 1319 Maclind St., St. Louis, Mo., and **Hunkin-Conkey Constr. Co.**, 1740 E. 12th St., Cleveland, O., LB **$2,300,000**, est. $3,300,000 (9 bidders), Millcreek Interceptor Sewer, CINCINNATI, O. City, City Hall, Cincinnati, O. Bids Mar. 29. CD 3/14.

▲ **Pierce Constr. Co.**, 3005 Bellvue Rd., Toledo, O. LB **$1,125,261**, est. $1,800,000, (6 bidders), extend



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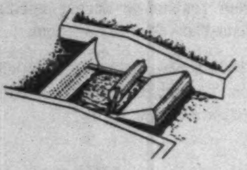

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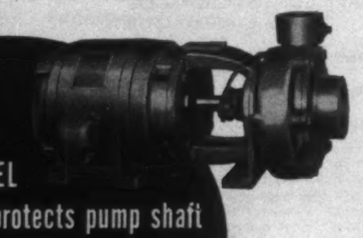

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Runway, 5-R-23L, Cleveland Hopkins Airport, CLEVELAND, O. City Dpt. Port Control, City Hall, Cleveland 14, O. Bids Mar. 31. CD 3/8.

▲ **INDIANA**—State Hy. Dpt., State House Annex, Indianapolis, Bids opened 3/31,

Ind.—**Rieth-Riley Constr.**, 2500 W. Fieldhouse Ave., Goshen, Ind., LB **$330,796**, est. $346,761, (2 bidders), concrete wid'n. and bit. resurf., Contr. RS-4920. Lagrange Co.; LB **$846,274**, est. $1,021,754, (9 bidders), c. conc., Contr. R-4927. Lagrange Co.;

Ind.—**McMahan Ill. Corp.**, Rochester, Ind., LB **$1,011,504**, est. $1,238,711, (9 bidders), c. conc. pavement, Contr. R-4924, Gibson and Knox Counties;

Ind.—**Stone City Constr.**, Bedford, Ind., LB **$528,594**, est. $598,717, (8 bidders), bit. pavement, Contr. R-4925, Washington Co.;

Ind.—**Vogel Constr. Co.**, 3760 E. St. Clair, Indianapolis, Ind., LB **$664,165**, est. $825,833, (6 bidders), c. conc., Contr. R-4926, Madison Co. CD 3/21.

▲ **INDIANA**—State Hy. Dpt., State House Annex, Indianapolis, Bids opened 3/31,

Ind.—**Dyer Constr. Co.**, 1716 Sheffield St., Dyer, Ind., LB **$801,643**, est. $907,767, (10 bidders), Bridge Contr. 4905, Lake Co.; LB **$241,698**, est. $262,905, (6 bidders), Bridge Contr. 4906, Lake Co.;

Ind.—**The Penker Constr. Co.**, 1030 Summer St., Cincinnati 4, O., LB **$948,005**, est. $1,048,831, (12 bidders), Bridge Contr. 4863, Benton Co. CD 3/16.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield,

Ill.—**Sangamo Constr. Co.**, 700 N. MacArthur St., Springfield, Ill., CA **$862,255**, paving, bridge, etc., Ill. Rte. 4, west of Nilwood, Macoupin Co.;

Ill.—**Eric Bolander Co.**, Winchester Rd., Libertyville, Ill., CA **$1,379,209**, paving 3.74 mi. ramps, interchanges FA 201 east of Grays Lake, Lake Co.;

Ill.—**Charles Ind Co.**, R.R. 1, Rockford, Ill., CA **$781,780**, paving 5.45 mi. US 20 from Winnebago-Stephenson line easterly, Winnebago Co.;

Ill.—**Fred Weber Constr. Co.** and **St. Louis Bridge & Grading**, 7929 Alabama Ave., St. Louis, Mo., CA **$971,792**, paving 4.5 mi. base course, resurf. Ill. 4, Carlinville southeast, Macoupin Co. Grand total $3,995,036. Bids Mar. 18, awarded Mar. 31. CD 3/22, under LB.

▲ **City of Chicago**, City Hall, Chicago, Ill., rejected bids Mar. 3, hangar for Delta Airlines, O'Hare Field, CHICAGO, ILL. LB **$2,185,000.** Naess & Murphy, 222 S. Michigan St., Chicago 4, Ill., archts. CD 3/9, under LB.

▲ **Link Belt Co., Prudential Plaza,** Chicago 1, Ill., LB **$1,199,155** (3 bidders), sediment removal equipment, Central Dist. Filtration Plant, Spec. 90, 381-60-1, CHICAGO, ILL. Dpt. Purchases, City Hall, Chicago 2, Ill. Bids Mar. 21. CD 3/3.

▲ **Malan Constr. Co.** 2 Park Ave., New York, N. Y. CA **$1,645,000,** No. 80.85 59-107, fuel tank facilities Chicago O'Hare International Airport, Park Ridge, CHICAGO, ILL. Dpt. Purchases, City Hall, Chicago 2, Ill. Bids Feb. 26, awarded Apr. 1. CD 3/1, under LB.

▲ **William E. Schweitzer & Co.**, 2207 Dodge St., Evanston, Ill., LB **$11,097,000** (6 bidders), four concourses, O'Hare Airport, CHICAGO, ILL. Dpt. Purchases, City Hall, Chicago, Ill. Bids Mar. 31. CD 2/24.

▲† **Five-Boro Constr. Corp.**, 2 Lafayette St., New York 7, N. Y., LB **$3,227,268** (5 bidders) modifying Wherry Housing Proj., IFB 11-623-60-29B, SCOTT AIR FORCE BASE, ILL. Base Procurement Office, Scott Air Force Base, Ill. Bids Mar. 28. CD 2/4.

▲† **Price Bros.-McClung Inc.**, 1932 E. Monument Ave., P. O. Box 825, Dayton, O., LB Est. **$1,174,913,** dredging St. Marys River between Moon Island and Lime Island, 23 mi. south of Sault Ste. Marie, IFB CIVENG-20-064-60-41, MICHIGAN, U. S. Eng., 1101 Washington Blvd., Detroit 31, Mich. Bids Mar. 9. CD 2/19.

BUILDINGS—LB & CA

Edward T. Honnert & Sons, 8250 Colerain Ave., Cincinnati, O., CA **$900,000** brick, stone SEMINARY, 3 and 4 Sts., CINCINNATI, O. Glenmary Missioners, Princeton Rd., Cincinnati, O. Elmer H. Schmidt, 2194 Victory Parkway, Cincinnati, O., archt. Hall, McAllister & Stockwell, 706 Walnut St., Cincinnati, O., engrs. Awarded Mar. 30.

▲ **Paul Cowgill**, 2160 Tremont Center, Columbus, O. CA Est. **$2,000,000,** 2nd phase Kingsdale SHOPPING CENTER, COLUMBUS, O. Kingsdale Co., 2160 Tremont Center, Columbus, O. CD 1/15, under LB.

Stephen Gross & Sons, Inc., 255 Campbell Dr., Hamilton, O., LB **$995,000** (7 bidders), JUNIOR HIGH SCHOOL, HARRISON, O. Three Rivers Local School Dist., Harrison, O. Bids Mar. 30. CD 3/2.

Hoelzl-Martini Constr. Co., 13515 Brookpark Rd., Cleveland 35, O. LB **$838,900,** (4 bidders) general contract HIGH SCHOOL, INDEPENDENCE, O. Bd. Educ., 6565 Brecksville Rd., Independence, O. Bids Mar. 29. CD 3/7.

▲ **Dunlop & Johnston, Inc.**, 17900 Miles Ave., Cleveland 28, O., CA Est. **$2,500,000,** two 15 story APARTMENTS, LAKEWOOD, O. 12520 Edgewater Corp., 1700 Miles Ave., Cleveland 28, O. CD 7/22; **Ernest F. Donley Sons, Inc.**, 10203 Miles Ave., Cleveland 5, O., CA Est. **$500,000,** steel fabrications and foundation forms for two 15 story APARTMENTS (Lakewood, O.).

▲ **Arbee Constr. Co.**, 3785 Grosvenor Rd., Cleveland, O., Own Forces, **$1,360,000,** 80 HOMES, Brookwood Estates, MENTOR, O. Anderson & Dracon, 4516 Brookpark Rd., Cleveland 34, O., archts.

▲ **B. G. Danis Co.**, 1518 E. 1st St., Dayton, O., CA Est. **$1,000,000,** 2 story, 37,000 sq. ft. BANK,

(Continued on page 126)

Second of a Series

TIRE TALKS

On the record—off the road

Leading U. S. Rubber scientists and engineers answer questions on recent advances in off-the-road tires for which they were in a large measure responsible

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United States Rubber
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(Continued from page 124)

Fountain Ave. and Main St., SPRINGFIELD, O. Springfield Savings Society, Savings Society Commercial Bank, 9 E. Main St., Springfield, O.

▲ **Thorp Constr. Co.**, P. O. Box 22, Evansville, Ind., CA **$1,790,000**, HOSPITAL, Gibson Co., PRINCETON, IND. Gibson Hospital, Princeton, Ind. Bids Dec. 22. CD 1/6, under LB.

▲ **A. L. Jackson & Co.**, 300 W. Washington Blvd., Chicago 6, Ill., CA **$4,000,000**, Holy Cross HOSPITAL addn., 2700 W. 69th St., CHICAGO, ILL. Holy Cross Hospital, 2700 W. 69th St., Chicago, Ill. Awarded Apr. 1. CD 2/19/56.

▲ **A. L. Jackson & Co.**, 300 W. Washington St., Chicago, Ill., CA **$22,000,000**, OFFICE, State St. and Wacker Dr., CHICAGO, ILL. United Insurance Co. of America, 1313 S. Michigan Ave., Chicago, Ill. CD 9/17/58.

▲ **Paschen Contractors, Inc.**, 2739 Elston Ave., Chicago, Ill., CA **$9,118,000**, Stage 1, William Green HOUSING, Proj. 2-30, Ogden and Division Sts., CHICAGO, ILL. Chicago Housing Authority, 608 S. Dearborn St., Chicago, Ill. Bids Mar. 15, awarded Apr. 1. CD 3/17, under LB.

▲ **Robin Constr. Co.**, 1333 N. Wells St., Chicago, Ill. CA **$4,250,000**, 20 story, 225 unit APARTMENT, 555 W. Cornelia Ave., CHICAGO, ILL. Julius Epstein & Sam Bergman, 231 S. LaSalle St., Chicago 4, Ill. L. R. Solomon, J. D. Cordwell & Assocs., 61 W. Superior St., Chicago, Ill., archts.

▲ **Evans & Lawrence Constr. Co.**, 441 N. Walnut St., Springfield, Ill., CA **$1,200,000**, remodeling MASONIC TEMPLE and SCOTTISH RITE CATHEDRAL, SPRINGFIELD, ILL. Masonic Temple, 420 S. 6th St., Springfield, Ill. Awarded Mar. 30.

▲ **Nelson & Co., Inc.**, 1550 Yout St., Racine, Wis., CA **$1,303,056** (9 bidders), HOME FOR AGED, ELKHORN, WIS. Walworth County, Courthouse, Elkhorn, Wis. Bids Mar. 28. CD 3/11.

Permanent Constr. Co., 2200 N. 3 St., Milwaukee, Wis., LB **$986,900** (9 bidders), general contract, HOUSING FOR ELDERLY, MILWAUKEE, WIS. Milwaukee Housing Auth., 333 W. North Ave., Milwaukee, Wis. Bids Mar. 29. CD 3/1.

▲ **Hutter Constr. Co.**, 134 Western Ave., Fond du Lac, Wis., LB **$1,484,950**, (7 bidders), general contract 1 story, 320 x 640 ft. John Muir JUNIOR HIGH SCHOOL, WAUSAU, WIS. Bd. Educ., Wausau, Wis. Bids Mar. 25. CD 3/8.

▲ **Case Foundation Co.**, 25 W. 125 Lake Keeneyville, Chicago, Ill., CA foundation for OFFICE, Woodward-East Jefferson, DETROIT, MICH. Michigan Consolidated Gas Co., 415 Clifford St., Detroit, Mich. Bids Mar. 1. CD 2/24.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

April 22 Minnesota April 29 Missouri

STREETS AND ROADS

April 19, 20 Texas April 21 Kansas
April 22 Minnesota April 29 Missouri

BUILDINGS—BA

▲ **Colo., Denver** — PLANT — BA 4/28 — Martin Co., 12250 South Highway No. 75, Littleton, 3 story, 100,000 sq. ft. Titan Missile Plant addn. $2,000,000. Extended date. Buell & Co., 730 14 St., archts. CD 3/9.

▲ **Tex., El Paso**—HOUSING—BA 5/5—U. S. Eng., 2132 Central Ave. S.E., Albuquerque, N. M., 1,000 units, No. 3, Capehart Housing at Fort Bliss. CD 4/8/59.

▲† **Tex., Fort Hood**—HOUSING—5/5—U. S. Eng., P.O. Box 1600, Fort Worth Dist., Fort Worth, 800 units Capehart Housing No. 2, ENG-41-243-60-25. Over $10,000,000. CD 3/31.

▲ **Tex., Hillsboro**—PLANT, etc—Bids Asked—Keaby-Mattison Co., 1954 Dutler Ave., Amber, Pa., asphalt-cement soil pipe manufacturing plant, 50-acre tract, $4,350,000; paving for area and auto center, $110,000; water sys., $60,000; site area earthwork, $75,000. CD 2/1.

BUILDINGS—SLC

▲ **Colo., Denver**—SHOPPING CENTER—Owner, c/o Walter Koelbel, 1845 South Sherman St., Denver, soon lets contract 80,000 sq. ft. shopping center, E. Hampden Ave. and South Glencoe St., 90,000 sq. ft. parking, $1,500,000. Fisher & Davis, 821 17 St., archts. Swanson-Rink Assocs., 1640 Boulder, mech. engrs., Bierbach & Horton, 300 E. 9 St., structural engrs. CD 2/4.

▲ **Colo., Denver**—APARTMENTS—Spears Investment Co., E. 9 and Ivy Sts., soon lets contract, four 5 story, 189 unit apartment using old shell of Spears unfinished hospital, $1,400,000. Simon & Hipp, 1922 E. 18 Ave. archts.

HEAVY CONSTRUCTION—LB & CA

▲ **MINNESOTA**—State Hy. Dpt., State Hy. Bldg., St. Paul, Bids opened 4/1,

Minn.—**Alexander Constr. Co.**, 4641 Hiawatha Ave., Minneapolis, Minn., LB **$1,749,948**, (7 bidders), base, concrete pavement and bit. surf. 3.1 mi. Dakota and Hennepin Counties;

Minn.—**Megarry Bros.**, St. Cloud, Minn., LB **$945,139**, (7 bidders), base, bit. surf. pumping station and bridges 3.1 mi., Anoka and Ramsey Counties;

Minn.—**W. K. Hodgman & Sons**, Fairmont, Minn., LB **$269,651**, (6 bidders), base, soil cement base and bit. surf. 7.5 mi., Blue Earth Co.;

Minn.—**Duininck Bros.**, Olivia, Minn., LB **$448,252**, (10 bidders), grade and bridge 12.1 mi., Cottonwood and Redwood Counties;

Minn.—**Central States Constr. Co.**, Crosby, Minn., LB **$642,958**, (6 bidders), concrete pavement and bit. shoulders 7.6 mi. Chippewa Co. CD 3/17.

▲ **MINNESOTA**—State Hy. Dpt., State Capitol Bldg., St. Paul, Bids opened 4/1,

W. D. Giertsen Co., 3501 Xenwood Ave. S., Minneapolis, Minn., LB **$1,965,264**, (11 bidders), Bridge No. 9300 over Mississippi River at Fort Snelling, Ramsey and Hennepin Counties. CD 3/17.

▲ **MINNESOTA**—State Hy. Dpt., Capitol Approach, St. Paul,

Industrial Constr. Co., 9216 Grand Ave., Minneapolis 20, Minn., CA **$1,407,245**, overpass and separation, three railways, 19 tracks, Bridge No. 6805, Ramsey Co. Bids Jan. 29. CD 2/2, under LB.

▲ **MINNESOTA**—State Hy. Dpt., Capitol Approach, St. Paul,

Woodrich Constr. Co., 201 18th Ave. S., Hopkins, Minn., CA **$1,439,044**, grading, base, concrete pavement, shouldering 8.5 mi. between Byron and Jct. TH 52, Olmsted Co.; CA **$871,765**, grading, base, concrete paving 6.2 mi. near Lamoille and in Winona, Winona Co. Bids Jan. 29. CD 2/2, under LB.

† **American Concrete Co.**, 1212 S. 13 St., Louisville, Ky., CA **$977,721**, casting articulated concrete mattress, CIVENG-40-041-60-48, ARKANSAS, U.S. Eng., P.O. Box 97, Memphis, Tenn.

▲† **Western Contracting Corp.**, 400 Benson Bldg., Sioux City, S. D., LB **$3,043,278**, (7 bidders), 7 million cu. yd. Stage 1 earthwork Big-Bend Dam, Fort Thompson, CIVENG-25-066-60-61 SOUTH DAKOTA, U.S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids Mar. 31, CD 2/15.

▲ **NEBRASKA**—State Dpt. Rds., State Capitol Lincoln, Bids opened 3/24,

Neb.—**Massman Constr. Co.**, 3917 Broadway, Kansas City Mo., LB **$1,513,145**, bridges, Lincoln-Omaha Rd. near Ashland, Proj. I 80-9(44), Cass and Sarpy Counties;

Neb.—**Foster-Smetana Co.**, 4360 Nicholas St., Omaha, Neb., LB **$718,909**, remodeling and wid'n bridge, South Sioux City, Nebraska and Sioux City, Iowa, Proj., F-49-A, Dakota and Woodbury Counties, Iowa. CD 3/17.

▲† **Beacon Constr. Co. of Boston**, 510 Karbach Bldg., Omaha, Neb., LB **$1,625,044**, est. $1,572,493 (concrete parking lot) **$1,599,870**, est. $1,556,604 (with black top), two 3 story, rein-con. Airmen's Dormitories, 13,000 sq. ft., rein-con. dining hall, Offutt Air Force Base, ENG-25-066-60-110, FORT CROOK, NEB. U.S. Eng., 1709 Jackson St., Omaha, Neb, Neb. Bids Mar. 31. CD 3/10.

Dugdale Constr. Co., 8611 Maple St., Omaha 14, Neb., LB **$995,209**, est. $1,106,141, (4 bidders), site preparation, sidewalks, utilities, sewers lighting at Omaha Municipal Airport, OMAHA, NEB. Omaha Airport Auth., City Hall, Omaha, Neb. Bids Mar. 30. CD 3/23, under LB.

▲ **Bob Eldridge Constr. Co., Inc.**, 3206 Strong Ave., Kansas City 6, Kan., CA **$1,558,000**, est. $1,507,000, (9 bidders), terminal, OMAHA, NEB. Omaha Airport Auth., City Hall, Omaha, Neb. Bids Feb. 10, awarded Feb. 17. CD 3/11, under LB.

Dugdale Constr. Co., 8611 Maple St., Omaha 14, Neb., CA **$995,209**, est. $1,106,141, (4 bidders), site preparation, sidewalks, utilities and sewers, apron paving and lighting, OMAHA, NEB. Omaha Airport Auth., Eppley Airfield, Omaha, Neb. Bids. Mar. 30, awarded Mar. 31. CD 4/4, under LB.

▲ **OKLAHOMA**—State Hy. Dpt., Capitol 5, Oklahoma City, Bids opened 3/29,

Okla.—**Peter Kiewit & Sons Co.**, Southeast Station, Wichita, Kan., LB **$996,160**, est. $1,319,839, (10 bidders), stab. aggreg. base, b. conc. surf. 6.383 mi. for 4-lane I-35 south of State Hy. 51 near Orlando, Payne Co.;

Okla.—**Amis Constr. Co.**, 1647 Exchange Ave., Oklahoma City 8, Okla., LB **$464,811**, est. $473,030, (6 bidders), wid'n., b. conc. surf. 1.28 mi. Hy. 51, Stillwater, Payne Co. CD 3/10.

▲† **H. B. Zachry Co.**, W. Harding Blvd., San Antonio, Tex., CA **$11,836,428**, construction of Twin Buttes Dam, near San Angelo in West-Central Texas, DC-5274, TEXAS. Bureau Reclamation, Dpt. Interior, Wash. 25, D. C. CD 3/22.

▲† **Thomas Bate & Sons**, 2311 10 St., Denver, Colo., CA **$1,145,402**, G/M Assembly and technical supply facilities, Lowry Air Force Base, Inv. No. ENG-25-066-60-98, DENVER, COLO. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids Mar. 18, awarded Apr. 1. CD 3/23, under LB.

BUILDINGS—LB & CA

▲† **H. L. Coble Constr. Co.**, 1705 Battleground Ave., Greensboro, N. C., LB **$6,650,000**, 470 unit Capehart HOUSING, Blytheville Air Force Base, BLYTHEVILLE, ARK. Base Procurement Office, Blytheville Air Force Base, Blytheville, Ark. Bids Mar. 24. CD 3/17.

▲† **Hill & Moore Constr. Co.**, 3000 Jacksboro Hy., Wichita Falls, Tex., CA **$1,296,236**, Wherry HOUSING UNITS repairs, imprvs., IFB AIV 34-031-60-29, FORT SILL, OKLA. Purchasing & Contracting Div. G4, U. S. Army Artillery & Missile Center, Fort Sill, Okla. Bids Mar. 18. CD 3/26.

▲ **Warner Constr. Co.**, P.O. Box 769, San Angelo, Tex., LB **$2,946,000**, est. $2,211,886 (bldg. only), (13 bidders), HIGH SCHOOL, ANDREWS, TEX. Andrews Ind. School Dist., Andrews, Tex. Reid, Rockwell, Banwell & Tarics, 1019 Market St., San Francisco, Calif., archts.-engrs. Bids Mar. 25. CD 2/29.

▲ **Fluor Corp., Ltd.**, 2500 S. Atlantic Blvd., Los Angeles 22, Calif., CA Over **$3,000,000**, design and construct GAS TREATING PLANT, EL PASO, TEX. El Paso Natural Gas Co., c/o El Paso Natural Gas Co., Bldg., El Paso, Tex. CD 6/12/57.

▲ **Rob. H. Smith & Co.**, 1915 Kolfahl St., Houston, Tex., CA Est. **$5,750,000**, 1 story, and three 3 story wings "Ramada Towers" HOTEL, swimming pools, HOUSTON, TEX., Loe Barshop-Holcombe Properties, Inc., 1500 S. Zarzamara St., San Antonio, Tex., Ramada Inns of America, Phoenix, Ariz., lessee. Wyatt C. Hedrick, 5201 Fannin St., Houston, Tex., archt.-engr. CD 3/23.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

May 4, 11 California

▲ **Calif., Los Angeles**—BA 4/29—Los Angeles County Flood Control Dist., 2250 Alcazar St., final unit, relief trunk storm drain crossing boundary lines of cities of Bell, Commerce and Vernon. $2,780,000. CD 11/10/58.

▲ **Calif., Sacramento**—BA 5/3—Sacramento Municipal Utility Dist., Engineering Dpt., 1708 59th St., Upper American River Project: 13 ft. diam. unlined 17,000 ft. Robbs Peak Tunnel Unit, Inv. No. 2214. Over $1.000.000. CD 1/8/58.

▲ **Wash., Auburn**—BUILDINGS—BA 6/6—Federal Aviation Agency, 5651 W. Manchester St., Los Angeles, Calif., bldgs. for air-traffic control center, Inv. 4-60-1060. Over $1,000,000.

BUILDINGS—BA

▲† **Calif., Monterey**—HOUSING—BA 4/20—Dist. P. Wks. Office, 12th Naval Dist., San Bruno, rehabilitation and conversion to Public Quarters Wherry Housing Proj., Naval Postgraduate School, NBy-22892 Spec. No. 22892/59. Over $1,000,000. CD 7/14.

▲ **Utah, Logan**—ENGINEERING & PHYSICAL SCIENCES—BA 4/26—Utah State Bldg. Bd., 419 State Capitol, Salt Lake City, Second Phase, engineering and physical science bldg., State University. $2,350,000. Plans deposit $100. Fred I. Markham, 45 N. University, Provo, archt. CD 8/7/59.

▲ **Utah, Brigham City**—SCHOOL—BA 4/27—Box Elder Co. Bd. Educ., high school. $1,750,000. Extended date. Plans deposit $100. Hodgson & Hollbrook, 807 Eccles Bldg., Ogden, Utah, archts. CD 1/12.

Wash., Bellevue—JUNIOR HIGH SCHOOL—BA 4/26—School Dist. 405, 82,000 sq. ft., steel frame and frame Chinook Junior High School, $950,000. Plans deposit $50. Naramore, Bain, Brady & Johanson, 904 7 Ave., Seattle, archts.

▲ **Calif., Los Angeles**—ACUTE UNIT, etc.—BA 6/15—Bd. Supervs. Los Angeles Co., 501 Hall of Records, acute unit and out-patients bldg., Harbor General Hospital. $14,360,449. CD 1/23/57.

HEAVY CONSTRUCTION—LB & CA

▲ **M-B Contracting Co.**, Box 2059, Anchorage, Alaska, LB **$1,214,354**, (4 bidders), grading, surf., lighting for runway extension, Anchorage International Airport, ANCHORAGE, ALASKA. State Comr. P. Wks., Juneau, Alaska. Bids Mar. 31 CD 3/2.

▲† **Patti-Macdonald Constr. Co.**, 1100 Fifth Ave., Seattle, Wash., and **Morrison-Knudsen Co., Inc.**, 319 Broadway, Boise, Idaho, LB **$2,216,235**, est. $2,561,558, Sch. C, rearward communication facilities, Ocean Cape, Inv. 60-27, ALASKA. U. S. Eng., 1519 S. Alaskan Way, Seattle 4, Wash. Bids Apr. 5, CD 3/25;

Peter Kiewit Sons Co., 1300 Aloha St., Seattle, Wash., LB **$1,742,630**, est. $2,022,836 Sch. B, communication facilities, Yakataga (Alaska);

Walsh & Co., Spenard, Alaska, LB **$581,967** est. $871,553, Sch. A, communication facilities, Boswell Bay (Alaska).

▲ **ARIZONA**—State Rd. Dpt., 206 S. 17 St., Phoenix, Bids opened 4/1,

Fisher Contg. Co., P. O. Box 6306, Phoenix, Ariz., LB **$1,598,242**, (9 bidders), select material aggregate base, b. conc. asp. conc. for finishing course and interchange structure, City of Bisbee, U. S. Rte. 80 beginning approx. 2 mi. east of Mule Pass Tunnel and extending easterly over new alignment U. S. Rte. 80, approx. 1.9 mi. Benson-Douglas Highway, Cochise Co. CD 3/9.

▲ **NEVADA**—Directors State Dpt. Hys., State Hy. Bldg., Carson City,

Isbell Constr. Co., 3113 S. Virginia St., Reno, Nev., CA **$1,262,699**, constr. approx. 8.238 mi. U. S. Hy. 95 between NW of Babbitt and S. of Schurz, Proj. F-006-4(6), Contr. 1074, Mineral Co., Bids Mar. 31. CD 3/21.

▲ **General Constr. Co.**, 3840 Iowa St., Seattle, Wash., CA **$1,665,854**, apron constr. at Pier 28, SEATTLE, WASH. Port of Seattle, Bell St. Terminal, Seattle 1, Wash., Bids Mar. 22, awarded Mar. 29. CD 3/24, under LB.

† **CALIFORNIA**—Bureau P. Rds., 133 Hermann St., San Francisco,

J. W. Briggs Co., P. O. Box 348, Redding, Calif., CA **$985,404**, road constr., Placerville-Lake Tahoe Hy. El Dorado National Forest, El Dorado Co. Bids Mar. 24. CD 3/11.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, Bids opened 3/31,

Calif.—**Guy F. Atkinson Co.**, 10 West Orange Ave., South

(Continued on page 130)

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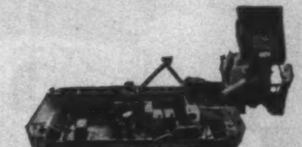

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(Continued from page 126)

San Francisco, Calif., LB **$11,712,105** (6 bidders), 3 level interchange at jct. of Golden State and Glendale Freeways in Los Angeles and addnl. 3.7 mi. freeway mostly on Golden State Freeway; 20 bridges and ramp structures, VII-L.A.-161-162 LA, Los Angeles Co. CD 2/10;

Calif.—**Ball, Simpson & Yeager**, 685 Delaware St., Berkeley, Calif., LB **$4,882,457** (8 bidders), grading, surf. to constr. 25.2 mi. four lane freeway US 91-466 between 1.5 mi. east of Baker and 1 mi. east of Cima Rd. near Valley Wells, incl. 3 interchanges and 10 bridges, VIII-SBD-31, L.M.N., San Bernardino Co. CD 2/17.

CALIFORNIA—State P. Wks., 1120 N. St., Sacramento, **Frederickson & Watson Constr. Co.**, 873 81 Ave., Oakland, Calif., CA **$938,449**, realignment 11.9 mi. U. S. Highway 395 between 1 mi. south of Baxter Creek and 2 mi. north of Milford, Lassen Co. Bids Mar. 23. CD 3/30, under LB.

▲† **MacDonald & Kruse, Inc.**, 3434 Verdugo Rd., Montrose, Calif., CA **$1,225,681**, channel imprvs. at Little Dalton Wash Channel, Fifth St. to Big Dalton Wash, Los Angeles County Drainage Area, near Azuza, CIVENG 04-353-60-22, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Mar. 30. CD 4/4, under LB.

▲† **E. L. Yeager Co.**, 1995 Aqua Mansa Rd., Riverside, Calif., LB **$1,594,159**, imprv. San Antonion and Chino Creek Channel, Santa Ana River Basin, San Bernardino Co., CIVENG-04-353-60-20, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Mar. 31. CD 3/2.

▲† **John Delphia, Patterson, Calif. and Fred J. Early, Jr. Co., Inc.**, 369 Pine St., San Francisco, Calif., CA **$1,270,586**, aviation field and supporting facilities, ENG-60-29, FORT ORD, CALIF. U. S. Eng., 180 New Montgomery St., San Francisco, Calif. Bids Mar. 28. CD 3/16.

▲† **L. E. Dixon Co. & W. E. Kier Constr. Co.**, 409 S. California St., San Gabriel, Calif., (joint venture), CA **$7,694,000**, Part Q-Labor and Security Bldg.; Part R, navigation aids, radar air traffic control center and parachute bldg., Lemoore Naval Air Station, NBy-25179, LEMOORE, CALIF. Dist. P. Wks. Office, 12th Naval Dist., Rm. C-112, San Bruno, Calif. Bids Mar. 9. CD 3/17, under LB.

▲ **Guy F. Atkinson**, Box 259, Long Beach, Calif., CA **$2,393,990**, concrete wharf Berth 92 and 93, A, B and C, San Pedro, LOS ANGELES, CALIF. Los Angeles City, Bd. Harbor Comrs., 1300 City Hall, Los Angeles, Calif. Bids Mar. 22. CD 3/28, under LB.

▲ **E. A. Irish**, 2944 Gleneden St., Los Angeles, Calif., LB **$1,393,872**, (8 bidders), Proj. 519, Proj. 407 Line C, Proj. 423 Line A and B, Proj. 589, Line A, cities of Baldwin Park, West Covina, and Covina, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. Bids Apr. 1. CD 3/15.

▲ **Lord & Bishop, Inc.**, P. O. Box 812, Sacramento, Calif., LB **$1,288,874**, Base Bid, (4 bidders), small craft harbor development, site clearing, dredging and filling, sewers, launching facilities, locker bldg., storage, etc., MARTINEZ, CALIF. City, City Hall, Martinez, Calif. J. H. Pomeroy, Inc., 120 Montgomery St., San Francisco, Calif., engr. Bids Mar. 29. CD 2/11.

▲† **Diversified Builders, Inc.**, Box 877, Paramount, Calif., LB **$2,390,000**, (5 bidders), various facilities, FY 1960, incl. photographic bldg., electronics maintenance shop, photographic installation calibration facility, warehouse various bldgs. addns., replacement of 5 kv distr. sys., repair and related work, incl. supportive facilities, Naval Missile Center, IFB 25924/59B, POINT MUGU, CALIF. Dist. P. Wks. Office, 11th Naval Dist., 1220 Pacific Hy., San Diego, Calif. Bids Mar. 29. CD 3/1.

▲† **Robert E. McKee General Contractor, Inc., & Nordic Constr. Co.**, 685 Ahua St., Honolulu 17, Hawaii, CA **$1,847,337**, est. $2,167,829 (5 bidders), 54,-250 sq. ft. steel maintenance hangar and lean-to, incl. 15,000 sq. ft. annex bldg. with simulator room, 4,800-sq. ft. steel masonry shop, 40,500 sq. yd. concrete parking apron, access road and utilities Hickman Air Force Base, Oahu, ENG 94-612-60-16B, HICKMAN FIELD, HAWAII. U. S. Eng., Fort Armstrong., Honolulu, Hawaii. Bids Mar. 29, CD 3/3.

BUILDINGS—LB & CA

† **Technical Constructors, Inc.**, 12820 Colt Rd., Dallas, Tex., LB **$963,088**, (11 bidders), SPECIAL POWER EXCURSION REACTOR TEST NO. 4 at National Reactor Testing Station, Inv. No. AT(10-1)-1022, ARCO, IDAHO. Atomic Energy Comn., Idaho Operations Office, Idaho Falls, Idaho. Bids Mar. 30. CD 3/22, under LB.

▲ **T. G. K. Constr. Co.**, 2750 W. McDowell Rd., Phoenix, Ariz., CA **$3,000,000, ELECTRONICS PLANT**, 52 St. and McDowell St., PHOENIX, ARIZ. Motorola, Inc., 4545 W. Augusta Blvd., Chicago, Ill. CD 2/5.

Seabold & Wilverton, 2051 N.W. Everett St., Portland, Ore., Owner Builds, **$950,000**, 9 story APARTMENT, PORTLAND, ORE.

▲ **Dalecrest Co.**, Box 609, Canoga Park, Calif., Owner Builds, **$1,664,600**, 116 stucco DWELLINGS, Hartland St., Hamlin St., Sheltondale Ave., CANOGA PARK, CALIF. Duncan & Conroy, 13310 Moorpark St., Sherman Oaks, Calif., archts.

Laramore Constr. Co., 111 Beverly Blvd., Whittier, Calif., CA **$930,060**, 78 DWELLINGS, Tract 3666, GARDEN GROVE, CALIF. Ascot Builders, Inc., 1111 Beverly Blvd., Whittier, Calif.

▲ **Diverco Constructors, Inc.**, 10238 Lakewood Blvd., Downey, Calif., LB **$1,167,500**, (9 bidders), CHRONIC DISEASE UNIT, Rancho Los Amigos Hospital, Hondo, LOS ANGELES, CALIF. Bd. Supervs. Los Angeles Co., 501 Hall of Records, Los Angeles, Calif. Bids Mar. 30. CD 3/7.

▲ **Fryar Constr. Co.**, 550 S. Fair Oaks, Pasadena, Calif., CA **$1,437,000**, rein.-con. COLLEGE addn., NORWALK, CALIF. Cerritos Junior College Dist., 11442 E. Alondra Blvd., Norwalk, Calif. Bids Mar. 17. CD 3/23, under LB.

▲ **Barney Wilkerson**, P. O. Box 2156, Riverside, Calif., LB **$1,294,356**, HEALTH BLDG., RIVERSIDE, CALIF., Riverside County, Courthouse, Riverside, Calif. Bids Mar. 31. CD 3/14.

▲ **Bob Long Constr. Co.**, P.O. Box 1623, Fresno, Calif., LB **$1,457,600**, (7 bidders), 279 room, 68,362 sq. ft. steel frame and masonry OUT-PATIENT BLDG., San Joaquin General Hospital, French Camp, STOCKTON, CALIF. San Joaquin County, Courthouse, Stockton, Calif. Bids Mar. 28. CD 3/7

Cotton Constr. Co., 1735 McKinley Ave., National City, Calif., LB **$915,500** (5 bidders), 27,600 sq. ft. Crestview ELEMENTARY SCHOOL addn. and Washington JUNIOR HIGH SCHOOL, VISTA, CALIF. Vista Unif. School Dist., 2000 Michigan Ave., Vista, Calif. Clyde Hufbauer, 1975 5 Ave., San Diego, Calif., archt. Bids Mar. 29. CD 5/28.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS

May 5 Alberta **May 11, 18 Ontario**

BUILDINGS—SLC

▲ **Que., Arvida**—PLANTS—Aluminum Co. of Canada Ltd., Sun Life Bldg., Montreal, soon lets contract two 45 x 132 ft. and 45 x 430 ft. smelter plant extensions, $2,000,000. CD 3/25.

▲ **Ont., Toronto**—FACTORY, etc.—English Electric Co. of Canada Ltd. (John Inglis Co. Ltd.) 14 Strachan Ave., soon lets contract, 1 story, 300x375 ft., structural steel with asbestos and glazed cladding rising from 10 ft. high brick dado factory, 2 story, 45x360 ft. office, $2,000,000. Allward & Gouinlock, 245 Davenport Rd., Toronto, archts. C. D. Carruthers & Wallace Consultants Ltd., 92 Yorkville Ave., engrs. CD 3/10.

▲ **Que., Montreal**—SHOPPING CENTRE—Ivanhoe Corp., 7101 Cote St. Luc Rd., soon lets contract, 1 story

(Continued on page 132)

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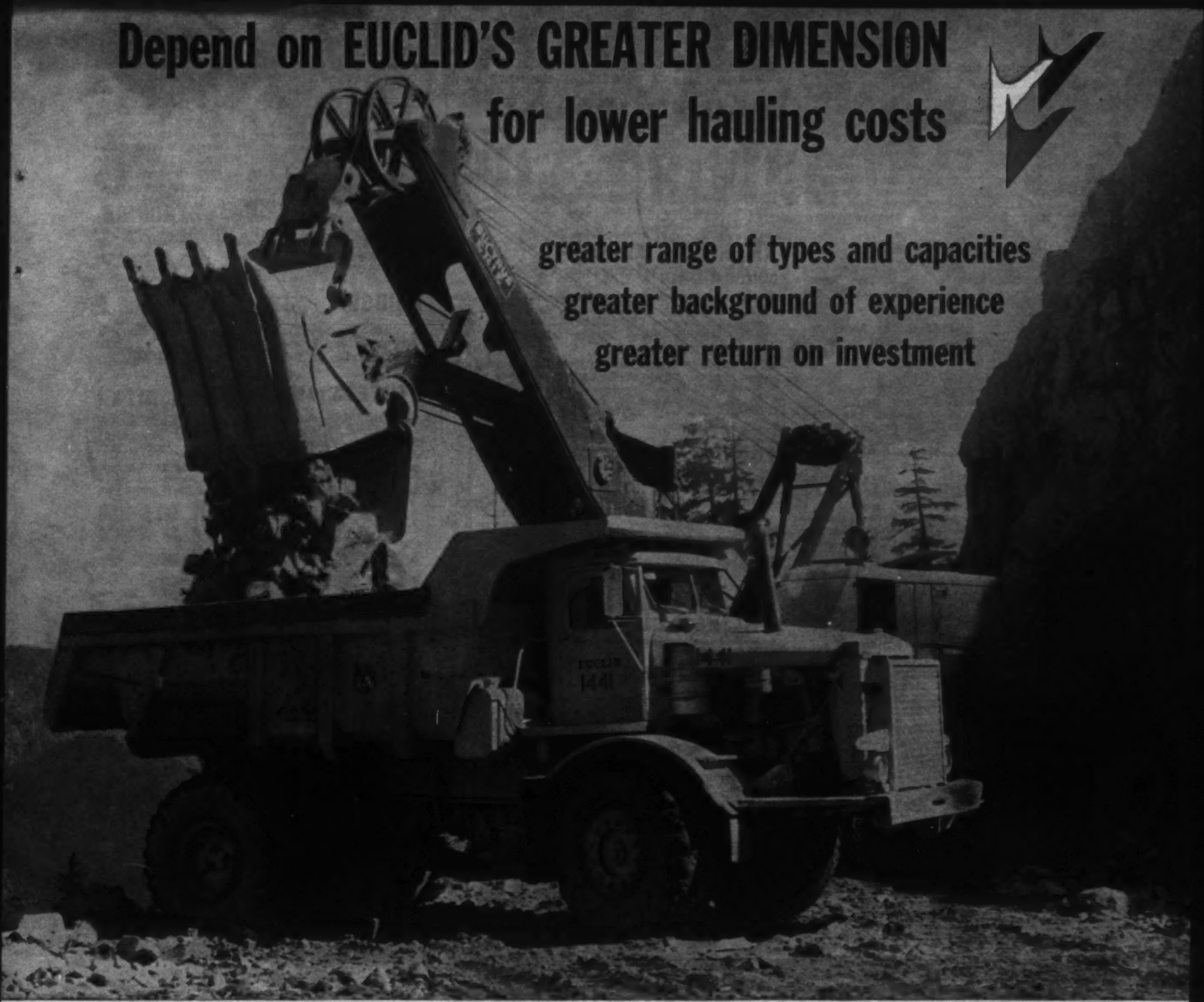
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EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

(Continued from page 130)

shopping centre, concrete fdn., Fleury and Pepineau Sts. $1,000,000. Eliasoph & Berkowitz, 4950 Queen Mary Rd., Toronto, Ont., archts. Affiliated Engineering Corps. Ltd., 940 Cote de Liesse Rd., Montreal, engrs. CD 2/15.

▲ **Que., Ste. Rosalie**—SHOPPING CENTRE— St. Hyacinthe Shopping Centre, 560 Hotel-Dieu St., soon lets contract, 70,000 sq. ft. shopping centre, Blvd. Sir Wilfrid Laurier, $1,000,000. Maurice Desnoyers, 1705 Girouard St., St. Hyacinthe, archt. Bourgeois & Martineau, 3365 Ridgewood Ave., Montreal, engrs. CD 3/16.

HEAVY CONSTRUCTION—LB & CA

▲ **Dravo of Canada Ltd.**, 159 Bay St., Toronto, Ont., CA Est. **$1,250,000**, 1,000 ft. dock on Lake Ontario at Lakeview Generating Station, incl. placing and driving 2,150 tons steel sheet piles in cell formation, placing 44,500 cu. yd. intruded aggreg. concrete, placing 12,000 cu. yd. massed and rein.-con., TORONTO, ONTARIO. Hydro-Electric Power Comn. of Ontario, 62 University Ave., Toronto, Ont. Bids Mar. 8. CD 2/12.

BUILDINGS—LB & CA

▲ **Stolberg Constr. (1957) Ltd.**, 1203 Mitchell Rd., Richmond, B. C., CA Est. **$3,000,000**, two units, timber SAWMILL, concrete fdn., 100x1,200 ft. dry shed, CASTLEGAR, B. C. Celgar Ltd., 1030 W. Georgia St., Vancouver, B. C. Phillips Barret & Partners, 2090 W. 4th St., Vancouver, B. C., engrs. Awarded Mar. 22. CD 3/4/59.

▲ **North American Building Ltd.**, Fort and St. Mary Ave., Winnipeg, Man., CA **$1,538,887**, 5 story, 80 x 200 ft. FEDERAL BLDG., northwest corner Edmonton and Ellice Sts., to house Unemployment Insurance Comn., WINNIPEG, MAN. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Bids Feb. 24, awarded Mar. 30. CD 3/2, under LB.

▲ **Bird Constr. Co. Ltd.**, Box 388, Port Arthur, Ont., LB **$2,550,777**, three 3 story, 62 x 233 ft. centre wing and two 2 story, 34 x 52 ft. interconnected wings HOSPITAL, PORT ARTHUR, ONT. Dpt. P. Wks., Rm. 6630 East Block, Parliament Bldgs., Toronto, Ont. Bids Mar. 30. CD 3/11.

▲ **Bennett-Pratt Ltd.**, 5 Maple Leaf Dr., Weston, Ont. CA Est. **$1,000,000**, (14 bidders), HOSPITAL EXTENSION, TORONTO, ONT. Northwestern General Hospital, Keele St., Toronto, Ont. Awarded Mar. 30. CD 2/15.

▲ **G. H. Montminy, Inc.**, 5 rue Richelieu, Quebect City, Que. CA **$1,250,000**, COLLEGE, Trans Canada Rd., MONTMAGNY, QUE. School Bd. of Montmagny, Montmagny, Que. Leo Turcotte, 466 rue de la Couronne, Quebec City, Que., archt. Paul-Henri Filion, 1057 rue des Erables, Quebec City, Que., engr. CD 5/2.

Construction Mont Royal Ltee, 960 Jean Talon St. E., Montreal, Que., CA **$994,212**, (5 bidders), 4 story, bsmnt., 65x245 ft., brick, rein.-con. SCHOOL, concrete fdn., Hochelaga and Latourneux Sts., MONTREAL, QUE. Montreal Catholic School Comn., 3737 Sherbrooke St. E., Montreal, Que. Bids Jan. 19, awarded Mar. 30. CD 1/26, under LB.

▲ **Germain Lauzon, Inc.**, 7920 Pie IX Blvd., St. Michel, Que., CA Est. **$2,000,000**, 6 story, 47 x 370 ft. rein.-con. HOSPITAL EXTENSIONS, concrete fdn., MONTREAL, QUE. St. Lambert General Hospital, 831 Notre Dame St., Montreal, Que. Awarded Mar. 28. CD 2/18.

AMERICANS ABROAD

BUILDINGS—LB & CA

▲ **Kaiser Engineers, Overseas Corp.**, c/o H. J. Kaiser Co., 300 Lakeside St., Oakland 12, Calif., U.S.A., CA design and construct CEMENT PLANT, in Mysore State, AMMASANDRA, INDIA. Mysore Cements Ltd., Ammasandra, India. CD 3/2.

▲ **Westinghouse Electric International Co.**, 40 Wall St., New York, N. Y., U.S.A. CA 62,500 kw Kosovo STEAM POWER PLANT, southwestern section of YUGOSLAVIA. Kosovo Lignite Kombinat, Govt. Yugoslavia, Belgrade. Gibbs & Hill, Inc., 461 8th Ave., New York, N. Y., U.S.A., engr.

FOREIGN

HEAVY CONSTRUCTION—BA

▲ **INDIA**—BA 5/9—Additional Chief Engineer, (Constr.) Kerala State Electricity Bd., Civil Branch, P. O. Box No. 21, Trivandrum-1, India, supply and erection penstock pipes and accessories, Sholayar H. E. Project, Tender No. H. E. P. 2/60. Extended date. Plans on payment of Rs. 63.24, each addnl. copy Rs 9.18. CD 3/11.

PROPOSED PROJECTS

SEWERS, WASTE DISPOSAL

▲ **Alaska, Spenard**—Spenard Public Utility Dist., lateral and connector mains and treatment plants or outfalls on Fish Creek for sewerage sys. $2,000,000. Tryck, Nyman & Assocs., East 5th Ave., Anchorage, consult. engrs. Bids this summer.

▲ **Calif., Redlands**—City, City Hall, sewage plant addn., trunk and main line sewers, **$1,118,750**. Engineering Science, Inc., 150 E. Foothill, Arcadia, engr. CD 3/21.

▲ **Conn., East Hampton**—Town, Town Hall, sewerage system, Skinnersville to Miller Hill, Colchester Ave, Smith St., E. High St., W. High St., Maple St. and Forest St. **$1,500,000**. Buck & Buck, 650 Main St., Hartford, consult. engrs.

▲ **Ill., LaGrange**—LaGrange Highlands Sanitary Dist., 5710 Harvey Ave., sanitary sewers, unincorporated area. **$1,570,000**. Walter Wilson, 105 W. Madison St., Chicago, Zone 2, consult. engr. Bids in Spring.

▲ **N. J., Spring Lake Heights**—Borough of Spring Lake Heights, Mercer Ave., sewerage sys. **$1,200,000**.

▲ **Pa., Johnstown**—Highland Sewer & Water Auth., 2842 Bedford St., sewers, lift station treatment plant **$3,036,784**. The Nellan Engineers, 150 W. Union St., Somerset, Pa., consult. engrs. Bids summer 1960. CD 3/21.

BRIDGES

▲ **VIRGINIA**—Dpt. Hys., 1221 E. Broad St., Richmond, **Mecklenberg and Brunswick Counties**—bypass U. S. Rte 58 Lawrenceville incl. 8 bridges, **$1,300,000**.

STREETS AND ROADS

▲† **COLORADO**—Bureau P. Rds. Bldg. 40, Denver Federal Center, Denver,

Boulder Co.—Project 26 H6, grading, bit. stab. base in South St. Vrain 4 mi., near Boulder, **$500,000**.

grading, bit. stab. base 9.2 mi., Nederland-Raymond, **$1,300,000**.

Delta Co.—grading, bit. stab. 3.2 mi. Proj. No. 13-E, Cedaredge-Mesa, **$615,000**.

Pueblo Co.—Proj. No. 35 G1, H1, I1, J1, bit. stab. base on Greenhorn Highway, 12.9 mi. near Rye, **$285,000**.

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany,

Richmond Co.—West Shore Expressway: Contr. 3, incl. West Bridge, dam and West Service Rd. 2.6 mi. **$4,293,000**. Howard, Needles, Tammen & Bergendoff, 99 Church St., New York, Zone 7, engrs. To go ahead in 1960. CD 3/18/57, under Richmond Boro, as owner.

▲ **Va., Arlington**—Bd. Supervs. Arlington Co. bond election May 17, storm sewers. **$1,034,000** CD 1/21.

▲ **Va., Norfolk**—City Dpt. P. Wks. City Hall, widening Hampton Blvd. to 4-lanes from Redgate to 21 St.; extension Brambleton Ave. to junction with Boulevard, incl. bridge over The Hague, **$2,600,000**.

EARTHWORK, WATERWAYS

▲ **Conn., Hartford**—Greater Hartford Flood Comn., 11 Asylum St., Dry Reservoir N. Branch Trout Brook,

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"Bugbee Reservoir," Mountain Rd., Flagg Rd., Albany Ave. area, 60 acres, West Hartford, $1,000,000. Talcott Reservoir, Talcott Mountain, 80 acres, West Hartford, $350,000; Dry Reservoir, to preserve Deadwood Swamp, Farmington, $500,000; Burnt Hill Reservoir, west of Tunxis Rd. Dry Reservoir, 25 acres, Farmington and West Hartford, $500,000. Anderson & Nichols, 11 Asylum St., consult. engrs. CD 2/14/57.

AIRPORTS

▲† **Calif., Lompoc**—OFFICE and DISPENSARY, etc.—U.S. Eng., 751 S. Figueroa St., Los Angeles, office and dispensary, communication facilities and missile facilities, Vandenburg Air Force Base, **$1,300,000** funds released.

▲ **Calif., Los Angeles**—AIR FREIGHT TERMINAL—Flying Tiger Lines, Inc., Lockheed Air Terminal, Burbank, plans by Charles Luckman & Assoc., archts.-consult. engrs., 9220 Sunset Blvd., air freight terminal, loading and unloading facilities, Los Angeles International Airport. **$1,000,000.**

LATIN AMERICA

▲ **Colombia, Cartagena** — PLANT — International Petroleum Co., Cartagena, ammonia and nitric acid plant at refinery. **$13,000,000.**

▲ **ECUADOR**—Republic of Ecuador, Quito, 350 mi. highway. **$14,000,000.** Rader & Assocs., 100 Biscayne Blvd. South, Miami 32, Fla., U.S.A. engrs.

PUERTO RICO

▲ **Puerto Rico, San Juan**—HOTEL—Dr. Basilio Davila, Box 8127 Fndz, Juncos Station, San Juan, plans by Schimmelpfenning, Ruiz & Gonzalez, Montserrate Bldg., Ave. Munoz Rivera, San Juan, Puerto Rico, 8 story, 403 room luxury hotel, 5½ acre lot. **$7,000,000.**

U. S. POSSESSIONS

▲† **Canal Zone**—HOUSING—Panama Canal Co., Balboa Heights, housing, Pacific side, Balboa Heights. **$2,615,000.**

FOREIGN

▲ **East Germany, Berlin**—TELEPHONE—Ministerium fur Post-& Fernmeldewesen der DDR, Berlin, 8 floor telephone bldg. **$1,400,000.**

▲ **East Germany, Leipzig**—OPERA HOUSE—Leipzig Municipality, 1,700 seat opear house. **$1,250,000.** VEB Hochbau, Leipzig, East Germany, engr.

▲ **Indonesia**—HARBORS—Govt. of Indonesia, Jakarat, plans by Daniel, Mann, Johnson & Mendenhall, archts.-engrs., 1145 19th St. N.W., Wash., D. C., constr. 14 harbors. **$11,000,000.**

▲ **Japan**—Nihon Doro Kodan (Japan Highway Public Corp.) 45 mi. four lane expressway from Amagasaki to Ritto. **$131,000,000.** Project will go out for International bidding.

▲ **West Germany, Berlin**—Senate for Housing & Building, Wurttembergstr. 6, West Berlin, 246 ft. steel, concrete bridge. **$1,000,000.**

PUBLIC BUILDINGS

▲ **Alaska, College**—GYMNASIUM, etc.—State of Alaska, State Dpt., Juneau, plans by Linn A. Forrest, 622 Hemlock Way, Juneau, gymnasium and utility bldg. at University of Alaska. **$2,000,000.** CD 4/10/59.

▲ **Conn., Hartford**—FIRE HOUSE—City, City Hall, plans by Ebbetts, Frid & Prentice, 862 Asylum Ave., 4 fire houses, Franklin Ave., Sisson Ave., Affleck St., Clark St. **$1,200,000.** A. John Macchi, 44 Gillett St., consult. engr. Jerome F. Muller, 15 Lewis St., mechanical engr. CD 6/6/58.

▲ **Conn., Meriden**—HOUSING—Meriden Housing Auth., 63 Broadvale Rd., plans by William H. MacKay, 137 Colony St., 140 unit 5 bldg. low-rental housing Mill Brook, **$2,359,000.** Hubbard, Lawless & Blakeley, 110 Whitney Ave., New Haven, consult. engrs. Schilling & Goldbecker, 18 Trumbull St., New Haven, assoc. archts. Charles A. Currier & Assocs., 740 N. Main St., West Hartford, site engrs. CD 9/27/57.

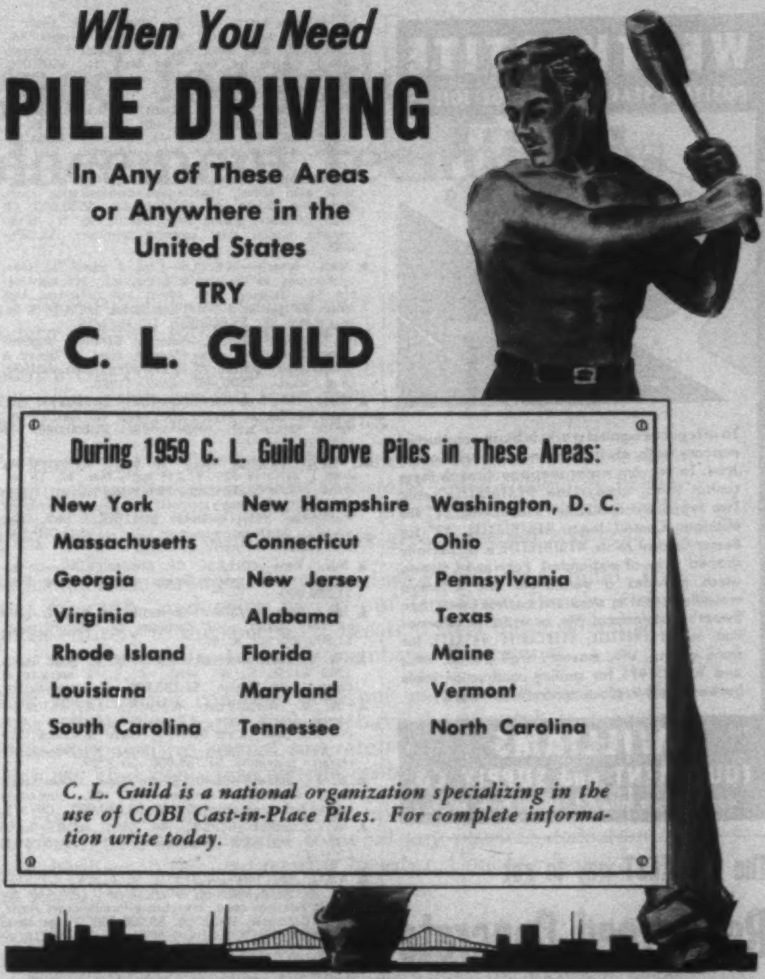
▲ **Conn., Norwich**—TECHNICAL INSTITUTE—State P. Wks. Dpt., 165 Capitol Ave., Hartford, plans by Lester J. A. Julianelle, 241 Orange St., New Haven, 2 story, brick, stone, air conditioned State Technical Institute, **$1,152,000.** Hubbard, Lawless & Blakeley, 110 Whitney Ave., New Haven, consult. engrs. Joseph F. Barba, 57 Grandview Ave., Hamden, mechanical engr. CD 9/29.

▲ **Fla., Sanford**—COURTHOUSE—Seminole County, plans by James Gamble Rogers, 145 Lincoln Ave., Winter Park, county courthouse, **$1,500,000.**

▲ **Ga., Atlanta**—NURSES HOME—Fulton-De-Kalb Hospital Auth., c/o Grady Hospital, 80 Butler St. S. E., plans by Percy Perkins, 1368 W. Peachtree St. N. W., 5 story nurses homes, **$1,000,000.** C. M. Galley, 1368 W. Peachtree St. N. W., structural engr. CD 11/10/58.

▲ **Ga., Milledgeville** — KITCHEN STORAGE — Georgia Dpt. P. Health, 12 Capitol Square, Atlanta, plans by Gregson & Assocs., Mortgage Guarantee Bldg., Atlanta, centralized kitchen storage, at State Hospital. **$1,250,000.** Ammons, McClure & Caldwell, 18 Peachtree Place N.E., Atlanta, plumbing, heating and air conditioning engrs. CD 1/27.

▲ **Ill., Belleville** — SCHOOLS — Belleville Elementary School Dist. 118, Bd. Educ., 700 Lucinda St., plans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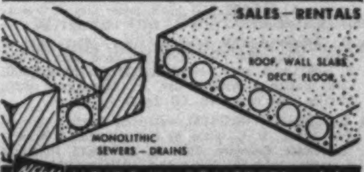

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by Pearce & Pearce, Inc., 721 Olive St., St. Louis 1, Mo., West Junior High School, Royal Heights Rd., $1,000,000. Bids about June 24; Douglas Elementary School, Carlyle Rd. near East Main St., $500,000. Bids about May 13; Abraham Lincoln Grade School, $500,000. Bids about June 17. CD 12/31.

▲ **Ill., Cahokia (East St. Louis P. O.)**—AERONAUTICAL LABORATORY—St. Louis University, 221 N. Grand Blvd., St. Louis 3, Mo., plans by Albert M. Goedde, 5 Bank Square Bldg., Edgemont, East St. Louis, 1 story, 17,500 sq. ft. Aeronautical Laboratory-Classroom Bldg., incl. seven laboratories, supersonic wind tunnel, theatre-type demonstration room, Parks Air College, div. of University, **$580,000**, CD 3/29; 3 story, ground floor, 54,000 sq. ft., brick, masonry blocks, steel concrete dormitory, **$1,029,600.**

▲ **Mass., Beverly**—SCHOOLS—City, 3 Essex St., plans by Korslund, Le Normand & Quann, Inc., 506 Washington St., Norwood, high school and converting high school for use as Junior High School, off Herrick St. near Cabot St. **$5,000,000.** CD 12/1/59.

Mass., Sheffield—SCHOOL—Southern Berkshire Regional School Dist. Comn., Supt. Schools, plans by Russell & Gibson & Von Dohlen, 10 Ellsworth Rd., East Hartford, Conn., school. **$500,000.** Constr. 1960.

▲ **Mass., Winthrop**—SCHOOL—Town, 14 Pauline St., plans by Tekton Assoc., Inc., 200 W. Central St., Natick, Senior-Junior High School. **$1,000,000.** CD 4/21/59.

▲ **Mo., St. Louis**—SCHOOLS—Bd. Educ., 911 Locust St., Zone 1, defeated $24,297,239 bonds Mar. 22, 14 elementary schools, 11 elementary school addns., expansion of 10 elementary schools, playgrounds, Southwest high school addn., McKinley High School addn., high school in northwestern part of city, etc. **$26,000,000.** Will resubmit in April. CD 2/16.

▲ **Nev., Reno**—COLLEGE OF ENGINEERING—University of Nevada, plans College of Engineering Bldg. **$1,800,000.**

▲ **Nev., Reno**—HISTORY—University of Nevada, plans by Vhay Assocs., 508 Denslowe Dr., history bldg., **$1,500,000.** CD 3/18.

▲† **N. J., Cape May**—BARRACKS—U. S. Coast Guard, 1300 E. St. N. W., Wash., D. C., 2 barracks at Coast Guard Station, **$1,183,000**, no appropriation.

▲† **N. M., Albuquerque**—RESEARCH LABORATORY—Atomic Energy Comn., Albuquerque Operations Office, P.O. Box 5400, plans by W. C. Kruger & Assocs., 227 E. Palace St., Santa Fe, 3 story, 60,000 sq. ft. research laboratory, **$1,780,000.** CD 7/29.

▲ **N. Y., Baldwin**—SCHOOLS—Bd. Educ., High School Dist., defeated referendum Mar. 23, elementary school and Junior High School. **$4,830,000.** CD 3/7.

▲ **N. Y., Dunkirk**—SCHOOL—Bd. Educ., defeated bonds Mar. 22, high school, **$3,994,000.** Will be resubmitted. CD 3/2.

▲ **N. Y., New York**—DOMESTIC RELATIONS COURT—Dpt. P. Wks., Municipal Bldg., Zone 7, PW-169 domestic relations court, near Bronx County Court House, Grand Concourse, Bronx Co. **$3,000,000.** To go ahead in 1962.

▲ **N. Y., New York**—HOSPITAL—Dpt. P. Wks., Municipal Bldg., Zone 7, Proj. HO-168, Governeur Hospital, Henry St., Jefferson St., Madison St. and Clinton St. for Department Hospitals. **$7,500,000.** To go ahead in 1963.

▲ **N. Y., New York**—HOSPITAL ADDN.—Dpt. P. Wks., Municipal Bldg., New York 7, Proj. HO-236, Lincoln Hospital addns., alterations for Department Hospitals. **$3,500,000.** To go ahead in 1965.

▲ **N. Y., New York**—MAGISTRATES COURT, etc.—Dpt. P. Wks., Municipal Bldg., Zone 7, PW-119, magistrates court and social court bldg., Lower Manhattan Area. **$4,000,000.** To go ahead in 1962. CD 11/18/46.

▲ **N. Y., West Seneca**—SCHOOLS—Bd. Educ., 3330 Seneca St., bond election Apr. 26, Junior High and Elementary School **$3,421,000.** Pfohl, Stoll & Roberts, 185 Niagara St., Buffalo, archts.

▲ **N. C., Charlotte**—SCHOOL—Bd. Educ., City Hall, plans by McDowell & Brackett, 305 Wilder Bldg., Ashley Park High School, **$1,000,000.**

▲ **N. C., Greensboro**—LIBRARY—Bd. Supervs. Guilford Co., Courthouse, and City of Greensboro, City Hall, library. **$1,300,000.** CD 12/3, under City of Greensboro, as owner.

▲ **O., Amelia** — HIGH SCHOOL, etc. — West Clermont School Dist., Ohio Pike, $915,000 bond election May 3, high school addn., elementary school, **$1,969,000.** Cyrus Baxter & Assocs., Oak St., Mariemont, archt. Election date postponed. CD 2/17.

▲ **O., Cleveland**—HOSPITAL—Veterans Admin., Vermont Ave., Wash., D. C., plans by Dalton-Dalton & Assocs., The Arcade, Cleveland, Zone 14, and Smith, Hinchman & Grylls, 3107 W. Grand Blvd., Detroit, Mich., hospital, East Blvd. and E. 105th St. **$10,000,000.** CD 10/29/57.

▲ **O., North Robinson**—HIGH SCHOOL—North Robinson Local School Dist. plans by Edwards & Burris, Marion, high school, swimming pool. **$1,250,000.** CD 11/9.

▲ **Pa., Elmhurst**—SCHOOL—Elmhurst School Dist., elementary school addn., Proj. 623A, **$1,125,000.**

▲ **Pa., Mars**—SCHOOL—Adams-Mars-Middlesex-Valencia Joint School Dist., plans by W. C. Eckles Co., LS & T Building, New Castle, Junior-Senior High School Bldg., Proj. 599. **$2,500,000.** CD 10/27.

▲ **Pa., Scotland**—COTTAGE UNIT—General State Auth., 18th and Herr Sts., Harrisburg, 12 cottage unit **$1,500,000** and chapel **$450,000.** Scotland School for Veterans Children. A. F. Jones, ch. engr., c/o owner.

▲ **Pa., Williamsport** — SCHOOL — South Williamsport Area Joint School Dist., South Williamsport, plans by White & Floyd, 484 Main St., Geneva, N. Y., Secondary School, Proj. 613. **$1,500,000.**

▲† **S. D., Fort Meade**—LAUNDRY, etc.—Veterans Admin., Dir. Constr. Service Munitions Bldg., Wash. 25, D. C., 8,451 sq. ft. laundry and 24,000 sq. ft. dining hall and kitchen, **$1,684,200.** Ellerbe & Co., 333 Sibley St., St. Paul, Minn., archts.-consult. engrs. CD 10/3.

Tex., Robstown—DWELLING UNITS—Housing Authority, plans by Victor Brock & Associates, 207 Jones Bldg., Corpus Christi (Tex. 163-1), 70 dwelling units, $700,000. CD 7/24.

▲ **Va., Arlington**—SCHOOL—Bd. Supervs. Arlington Co., bond election May 17, Drew-Kemper School addn. **$1,000,000.** CD 11/10.

▲ **Va., Bedford**—SCHOOL—Bedford Co. School Bd., high school, Rte. 122 North, **$1,250,000**; Southside School, **$962,500.**

▲ **Wash., Everett**—COURTHOUSE—Snohomish Co., Courthouse, courthouse addn. **$1,000,000.**

COMMERCIAL BUILDINGS

▲ **Ark., Fort Smith**—SHOPPING CENTER—Jewell R. Morris, 7005 Free Ferry Rd., 217 Belle, Phoenix Village Shopping Center, 15 acres, Towson Ave. and Phoenix St. **$1,000,000.**

▲ **Calif., Los Angeles**—MEDICAL CENTER—Crenshaw Plaza Medical Center, c/o Sidney Eisenshtat, archt., 1145 S. Beverly Dr., 4 and 6 story, 72,500 sq. ft. medical center, Rosalia Dr. **$2,000,000.**

▲ **D. C., Wash.**—HEADQUARTERS—Pan American Health Organization, 1501 New Hampshire Ave. N. W., headquarters bldg. Virginia Ave. E., 22 and 23 Sts. N. W. **$4,000,000.**

▲ **Fla., Orlando**—BANK—Florida National Bank, N. Orange St. and Market, plans by James Gamble Rogers, Lovelock & Fitz, 145 Lincoln Ave., Winter Park, 75,000 sq. ft. steel frame bank and parking **$1,500,000.**

▲ **Fla., St. Petersburg**—SHOPPING CENTER—Skyview Plaza, c/o D. J. Athan & Assocs., archts., 2622 Hillsboro Plaza, Tampa, 225,000 sq. ft. shopping center. **$3,500,000.**

▲ **Ga., Decatur**—FINE ARTS etc.—Agnes Scott College, 113 S. Candler St., plans by Toombs Amisano & Wells, 70 Fairlie St. N. W., Atlanta, Fine Arts Bldg **$750,000**, physical education bldg. **$1,000,000**, CD 4/14/59; plans by Ivey & Creek, Candler Bldg., Atlanta, dormitory **$600,000.**

▲ **Hawaii, Honolulu** — APARTMENT-HOTEL — Barkhorn Assocs., 2895 Kalakaua Ave., plans by Edwin L. Bauer, 1521 S. King St., Honolulu, Hawaii, 450 unit steel frame, concrete "The Colony House" Apartment-Hotel. **$8,000,000.**

▲ **Ill., Chicago** — HEADQUARTERS — American Library Assoc., 50 E. Huron St., plans by Holabird & Root, 180 N. Wabash, Zone 1, 5 story headquarters. **$1,000,000.**

▲ **Ind., Richmond**—LIBRARY, etc.—Earlham College, National Rd. W., Richmond, plans by Cy Baxter & Assoc., Oak St., Mariemont, O., library on campus, **$1,000,000**; student center, **$750,000.** Constr. late 1960.

▲ **Iowa, Davenport**—KAHL MEMORIAL HOME—Sisters of The Carmelite for Aged & Infirm, 1101 9 St., and Catholic Diocese of Davenport, 410 Brady St., plans by Stewart-Robison-Laffan, 601 Brady St., 125-bed Kahl Memorial Home addn., incl. recreational and therapy facilities, 1101 9 St. **$1,000,000.**

▲ **Mass., Marlboro** — SHOPPING CENTER — Owner, c/o Tekton Assoc., Inc., archt., 23 Washington St., Natick, shopping center, Rte. 20. **$1,000,000.**

▲ **Mass., West Roxbury** — HIGH SCHOOL — The Irish Christian Brothers, Moseley-on-the-Charles, Dedham, high school. **$1,350,000.**

▲ **Minn., Maplewood (P. O. St. Paul)**—TELEPHONE BLDG.—Northwestern Bell Telephone Co., 224 S. 5th St., Minneapolis, telephone bldg., Conway Ave. and Ascension Cemetery. **$1,000,000.**

▲ **Mo., St. Louis**—APARTMENTS—Webb & Knapp, Inc., 383 Madison Ave., New York 17, N. Y., plans by Hellmuth, Obata & Kassabaum, Inc., 315 N. 10th St., Zone 1, two 20 story apartments, Chippewa St. just west of Hampton Village Shopping Center. **$10,000,000.**

▲ **N. H., Windham** — MOTHER HOUSE — Sisters of Mercy, 435 Union St., Manchester, plans by Leo P. Provost, 61 Amherst St., Manchester, Mother House. **$1,000,000.** Constr. in April. CD 1/15/59.

▲ **N. J., Hohokus**—HOUSES—Stratford Ridge Manor, c/o Eugene Dinalia, 77 Passaic Ave., Passaic, 37 houses, Wearimus Rd. **$1,000,000.**

▲ **N. J., Paterson**—MOTEL—35 Church Street Corp., 35 Church St., plans by Sidney Schenker, 52 Church St., motel, with garage, Clark St. **$1,000,000.**

N. M., Santa Fe—OFFICE—New Mexico Educ. Assn., 130 S. Capitol Place, plans by W. C. Kruger & Assocs., 227 E. Palace Ave., 2 story, 30,000 sq. ft., steel frame, concrete block, brick, air conditioned, heating and ventilated office. **$500,000-$600,000.**

▲ **N. Y., New York**—APARTMENT—Joseph P. Blitz, Inc., 545 Madison Ave., Zone 22, plans by Boak & Raad, 175 Fifth Ave., Zone 10, apartment, 8-26 East 83rd St. **$1,700,000.**

▲ **N. Y., New York**—APARTMENT—Samuel N. Tomkin & Sidney Freedman, 241 Waverly Ave., Brooklyn

(Continued on page 138)

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When you rent or buy any pre-fab form, it will pay you to consider carefully what you're getting. If you want a panel that is built to give you maximum forming speed, economy, efficiency, and service life—look to Uni-Forms. More contractors are using them every day because Uni-Forms deliver where it counts . . . on the job.

Write for the UNI-FORM Panel Catalog. It contains complete details on the industry's most modern and flexible concrete forming system.

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a bridge
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NEW LUPTON RAILIGHT*

New LUPTON bridge railing has built-in General Electric luminaires

New LUPTON RAILIGHT* is today's most advanced concept in roadway lighting. Now available in standard units for all roadway installations, it offers you these significant advantages: greater driving safety from uniform low-level light focused directly on the road; unlimited opportunity for road railing design; savings in initial cost, operation, and maintenance.

Supplementary advantages are the elimination of glare; the confining of light to the road only; a clear view of roadway limits; increased effectiveness in fog, rain, or snow; efficient use of candle power.

And like every other LUPTON bridge job, installation is simple, because two men, with wrenches as their main tools, can install the lightweight aluminum parts. Maintenance is just as simple, because this non-rusting aluminum never needs painting—almost never needs replacement. And the lights themselves are handy for maintenance.

Write today to Michael Flynn Manufacturing Company's main office for more information on LUPTON RAILIGHT. Find out in detail how advantageously it can work for you.

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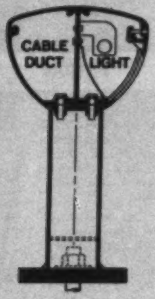

This cross section of LUPTON RAILIGHT shows the cable raceway, and how easily the top can be removed for maintenance with use of a simple special tool. A rigid shield of plastic protects the luminaire. Other top rail features include a reinforcing spine, and drain holes for condensed moisture.

LUPTON® RAILIGHT*

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But often forgetting the postal zone number when you address an envelope can delay your letter long enough to miss the appointed round. There are 106 cities in America where a complete address includes a zone number. Always use it when writing to or from these cities.

(Continued from page 134)

Zone 5, plans by H. I. Feldman, 415 Lexington Ave. Zone 17, apartment, 147-51 East 84th St. and 1241-49 Lexington Ave. $1,300,000.

▲ **N. Y., New York**—SCHOOL—Xavier High School, 30 W. 16th St., plans by Belfatto-Pavarini, 801 2nd Ave., 5 story high school. **$4,000,000.**

▲ **N. Y., Niagara Falls**—SCIENCE—Niagara University, Lewiston Rd., plans by Pfohl, Stoll & Roberts, 185 Niagara St., Buffalo and Urban, Brayton & Burrows, 635 Madison Ave., New York, 2 story, steel frame, concrete science bldg. **$1,500,000.** Bids early summer. CD 11/24.

▲ **N. Y., Rochester**—APARTMENT, etc.—Lee Halperin, 935 Main St. E., five 150 unit apartments, incl. swimming pool, recreation area, Town of Chili. **$2,000,000.**

▲ **N. Y., Rochester**—SCHOOLS—Rochester Catholic Diocese, 50 Chestnut St., plans by Stickle & Assocs., 2422 Prospect St., Cleveland, O., high school, Irondequoit, **$2,000,000;** high school, site not selected, **$2,000,000.**

▲ **O., Akron**—HOSPITAL—Akron City Hospital, 525 E. Market St., hospital, incl. boiler plant, service and surgical units, **$6,000,000.**

▲ **O., Columbus**—HOMES—Huber Homes, Inc., 6749 E. Main St., 500 homes, south of Fran Rd. between Brown and Gantz Rds, Franklin Twp. **$6,000,000-$7,000,000.**

▲ **O., Columbus** — NURSING HOME — Heritage Acres Home, 55 Hoffman Ave., 100-bed geriatric nursing home, Lee Rd., Blendon Twp. **$1,000,000.**

▲ **O., Mansfield**—HOSPITAL—Mansfield General Hospital, 335 Glessner Ave., plans by Dan A. Carmichael, 5 E. Long St., Columbus, hospital wing **$2,385,105.** CD 11/20.

▲ **O., Willowick**—APARTMENTS—Duchon & McGinty, 31715 Vine St., four 6-family and four 12-family apartments, Lake Shore Blvd., extending to Orchard St. and 315 St. **$1,000,000.**

▲ **Pa., King of Prussia**—APARTMENTS, etc.—Anthony J. Volpi, 618 Charles Dr., plans by Haag & D'Entremont, Jenkintown, two 50 unit apartments and swimming pool. **$1,500,000.**

▲ **Pa., Wormleysburg**—APARTMENT, etc.—Arthur W. Rupley, 601 Bell Biew Blvd., Alexandria, Va., plans by H. W. Bender Assocs., 3025 Market St., Camp Hill, 120 unit apartment and swimming pool, Front and Haldam Sts. **$1,000,000.**

▲ **Tenn., Nashville**—HOTEL, etc.—Lakeland Acres, Inc., c/o Taylor & Crabtree, archts., 1812 Broadway, Nashville, hotel-restaurant, **$1,250,000.**

▲ **Tex., Austin**—STUDENT HOUSING—St Edward's University, 3000 S. Congress St., plans by Julian & White, 222 E. Guenther St., San Antonio, (CH-Tex-119D), Student Housing, **$1,047,000.**

▲ **Tex., Dallas**—SHOPPING CENTER, etc.—Chas. S. Dilbeck, Martin Roendorff & Associates, 3113 McKinney St., shopping center, **$2,500,000;** area and auto center hard pavement, **$100,000;** site area earthwork, **$60,000;** 4-acre Preston Rd., north of Valley View Subdivision.

▲ **Tex., Dallas**—OFFICE—Owner, c/o J. N. McCammon & Associates, archts.-consult. engrs., Meadows Bldg., office. **$1,000,000.**

▲ **Tex., Dallas**—MATERIALS MART, etc.—Trammell Crow, 425 S. Field St., plans by Harwell Hamilton Harris, 3603 Lemmon Ave., and Harold Berry, 423 S. Field St., 302,500 sq. ft. and 2 twin towers, each 10 story and 56 x 250 ft. each, Materials Mart, **$8,850,000;** plans auto parking center, hard pavement, **$125,000;** plans 25-acre site earthwork, **$75,000.** Stemmons Expressway and Industrial Blvd., Bids soon.

▲ **Tex., Fort Worth**—SHOPPING CENTER, etc.—C&M Development Corp., 2716 E. Lancaster St., plans by Thomas E. Stanley, Rowan Bldg., 1 and part 2 story, 325,000 sq. ft., masonry, concrete, steel, air-conditioned Richland Plaza Shopping Center, 3,500 cars park area, at intersection Highways 121 and 183 in Haltom City area. **$4,000,000.**

▲ **Tex., San Antonio**—DORMITORIES—Trinity University, 715 Stadium Dr., (CH-Tex-118 D), 200 men's dormitory and 100 women's dormitory, **$1,520,000.** CD 7/22/53.

▲ **Tex., Waco**—SCIENCE, etc.—Baylor University, 1401 S. 5th St., plans by Pitts, Mebane & Phelps, 1872 Calder Ave., Beaumont, 3 story, 104,000 sq. ft., concrete, steel frame, brick, air conditioned, etc., Chemistry and Physics Science. **$1,900,000.** Pitts, Mebane & Phelps, 1872 Calder Ave., Beaumont, and Zumwalt & Vinther, 929 Mercantile Securities Bldg., Dallas, consult. engrs. CD 8/21.

▲ **Va., Bluefield**—BANK—First National Bank, Bland and Federal, bank, **$1,000,000.**

▲ **Va., Bristol**—SHOPPING CENTER—Southside Shopping Center, Inc., Bland St., shopping center, **$1,250,000.**

▲ **Va., Hampton**—MOTEL—Strawberry Banks Co., c/o A. I. Hoffman, 325 W. Olney Rd., Norfolk, plans by Woodward & Smith, Flat Iron Bldg., Norfolk, motel, **$2,500,000.**

▲ **Va., Manassas**—HOSPITAL—Prince William County Medical Society, hospital, **$1,000,000.**

▲ **Va., Newport News**—HOSPITAL—Riverside Hospital, 245 50 St., plans by Williams, Coile & Blanchard, 3415 4 Ave., hospital, J. Clyde Morris Blvd. **$7,000,000.** Bids late Fall 1960. **(Correction**—architects address.) CD 3/28.

▲ **Va., Richmond**—STORES, etc.—Davis Distributing Co., 3426 W. Cary St., retail stores and office, Belt Blvd. Southside, **$1,000,000.**

▲ **Wash., Seattle**—RETIREMENT HOME—Northgate Co., 310 E. 110 St., 8 story retirement home, **$3,000,000.**

▲ **W. Va., Glen Dale**—HOSPITAL—Reynolds Memorial Hospital, Wheeling Ave. and 8th St., hospital. **$1,750,000.**

W. Va., Philippi—HOSPITAL—Broaddus Hospital, College Hill, hospital addn. **$450,000.**

▲ **Wis., Superior**—HOSPITAL—Superior Memorial Hospital, Inc., 1213 Tower Ave., plans by N. R. Dobberman & K. W. Helske, 204 Board of Trade Bldg., and Bettenburg, Townsend, Stolte & Comb, 1437 Marshall Ave., St. Paul, Minn., memorial hospital, E. of Hy. 35 on S. edge of here, **$1,500,000.** CD 9/19/58.

▲ **Ont., Brantford**—SHOPPING CENTRE—Owner, c/o P. J. Harvey, 63 Darling St., plans by Wilfred H. Maxwell, consult. archt., Hamilton, shopping centre, between West St. and Harris Ave. **$1,500,000.**

▲ **Que., Beauceville West**—HOSPITAL—Corp. de l'Hopital St. Joseph, Beauceville West, hospital extension, **$1,900,000.**

▲ **Que., Montreal**—APPRENTICE TRAINING CENTRE—Montreal Building Trades Apprentice Training Comn., 2225 Laurier Ave. E., plans by Paul-Henri Lapointe, 3534 Cote des Neiges Rd., apprentice training centre, incl. swimming pool, gymnasium, bowling alleys, Parthenais St. **$2,000,000.** Brouillet & Carmel, 3600 Barclay Ave., consult. engrs.

INDUSTRIAL BUILDINGS

▲ **Illinois**—STEAM POWER PLANT—Southern Illinois Power Cooperative, Steeleville, 99,000 kw. steam power generating plant on South Fork of Saline River, south of Marion, **$20,800,000.**

▲ **Ill., Chicago**—PLANT—Riverside Plaza Corp., c/o Oliver Turner Co., 201 N. Wells St., plans by Graham, Anderson, Probst & White, 201 N. Wells St., Zone 6, remodel Chicago Daily News Plant, air-conditioning, 400 W. Madison St. **$3,000,000.**

▲ **Minn., St. Paul**—DISTRIBUTION CENTER—Montgomery Ward & Co., 1400 University Ave., distribution center. **$2,000,000.**

▲ **N. J., Rockaway**—PLANT—Boonton Radio Corp., Intervale Rd., Boonton, plans by C. H. Convery, 100 Summit Ave., Summit, plant, Beach Glen, **$1,000,000.**

▲ **N. C., Goldsboro**—STEAM ELECTRIC PLANT—Carolina Power & Light Co., 419 Fayetteville St., Raleigh, 320,000 kw Quaker Neck steam-electric plant addn., near here. Over **$8,000,000.**

▲ **N. C., Greensboro**—RESEARCH—P. Lorillard Co., Inc., 200 E. 42nd St., New York, N. Y., plans by Lockwood Greene Engineers, Inc., 41 E. 42nd St., New York, N. Y., tobacco research bldg. addn. and cigarette mfg. plant addn.

▲ **N. C., Henderson**—PLANT—J. P. Taylor Tobacco Co., 201 S. 3rd St., Richmond, Va., tobacco processing plant, **$1,500,000.**

▲ **Ore., Springfield**—PLANT—Borden Chemical Co., 360 Madison Ave., New York 17, N. Y., synthetic resin and formaldehyde plant addn. Over **$1,000,000.**

† **S. D., Brookings**—LABORATORY—General Services Admin., 19 and F Sts. N.W., Wash., D. C., plans by Hugill, Blatherwick, Fritzel & Kroeger, 366 Boyce-Greeley Bldg., Sioux Falls, entomology research laboratory for Agricultural Research Service of Dpt. of Agriculture. **$550,000-$1,000,000.** ($550,000 appropriation.)

Tex., Houston—WAREHOUSING—Syndicate, Dr. Bernard Waidhofer, trustee, 1612 Alabama St., warehousing, 2½ acres SW Freeway and Alief Rd., **$600,000.**

▲ **Va., Hopewell**—PLANT—Allied Chemical Co., National Analine Division, 61 Broadway, New York, N. Y., fine-denier nylon plant. **$5,000,000.**

▲ **Ont., Brampton**—PLANT—American Motors (Canada) Ltd., Base Line Rd. and Kennedy Rd., plans by Gilelland & Janiss, 745 Mt. Pleasant Rd., 250,000 sq. ft. brick, aluminum siding plant, **$1,500,000.**

▲ **Que., Lac Mattagami**—MINE—Mattagami Lake Mines Ltd., Rm. 225, 12 Richmond St. E., Toronto, Ont., zinc mine development, Lac Mattagami area, **$20,000,000.** R. K. Kilborn & Assocs., Ltd., 39 Parklane Ave., Toronto, Ont., consult. engrs.

UNCLASSIFIED

▲ **Calif., Oakland**—SPORTS STADIUM—Alameda Co., Dpt. P. Wks., Courthouse, **$13,700,000** bond election June 7, municipal sports stadium. CD 7/30/57.

▲ **Ga., Savannah**—BERTHS—Georgia Ports Auth., P.O. Box 1039, 3 berths and 2 transit sheds, Garden City Shipping Terminals. **$4,000,000.** Robert & Co., 96 Poplar N.W., Atlanta, consult. engrs.-archts. CD 3/14.

▲ **Illinois**—TRANSMISSION LINES—Southern Illinois Power Cooperative, Steeleville, 354 mi. 69,000 volt transmission lines from generating plant near Marion to connection with distr. systems of Egyptian Electric Cooperative Assn., Steeleville, Southeastern Illinois Electric Cooperative, Eldorado, and Southern Illinois Electric Cooperative, Dongola, **$4,600,000.**

▲ **Que., Montreal**—TELEVISION STUDIOS, etc.—Canadian Marconi Co., 2442 Trenton Ave., Mount Royal, television studios, offices, workshops, Park Ave. and Jean Talon St. **$3,000,000.**

(Proposal Advertisement see pp. 149 to 152)

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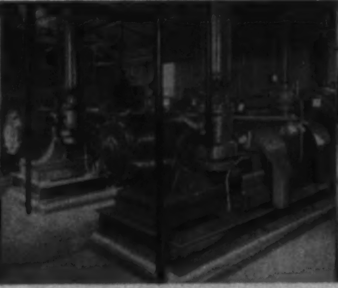

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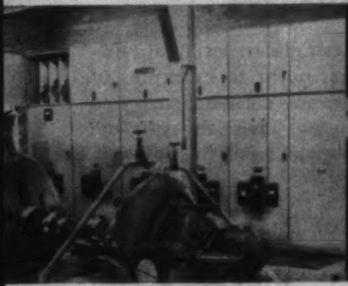
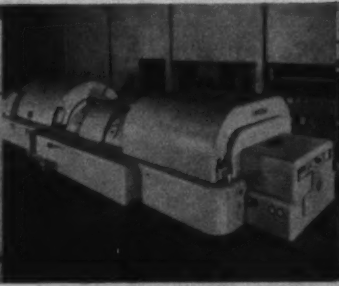


☐ MOTOR CONTROL



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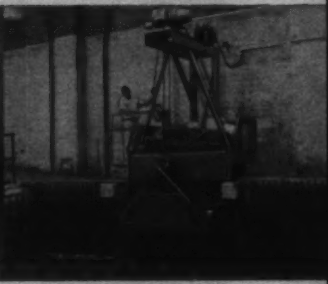

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In addition to all the products shown above, there's another dozen* supplied by Allis-Chalmers. Whether you need equipment for sewage plants, water works, municipal power plants, or street and highway maintenance . . . Allis-Chalmers is your most convenient single source.

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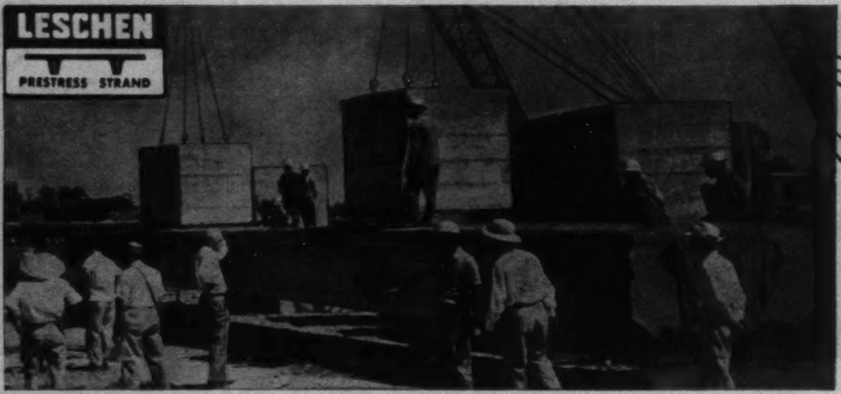
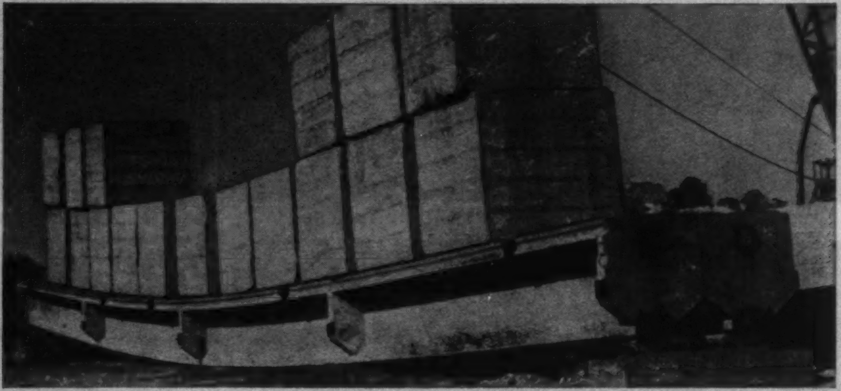
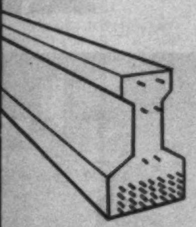


START OF TEST LOADING on two 80-foot prestressed girders. Each contains 26 Leschen Prestress Strands under tension.



153-TON LOAD—more than four times design load. Deflection was 24 inches with no failure of concrete or strand. Test made for acceptability of 1400 girders for South Vietnam construction project.

LOADS REMOVED—approximately 85% recovery of deflection immediately. Only hairline cracks evident. Designer—Capital Engineering Corp.; General Contractor—Johnson, Drake & Piper of Vietnam, Inc.; Technical Assistance—Freysinnet Co., Inc.



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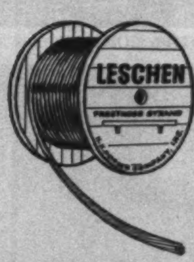
He can discuss technical problems, point to examples of prestressed construction in your area, and advise on costs and delivery of beams from his yard.



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Business and Finance

Supervisory Service Hits Engineer's Net

Lockwood, Kessler & Bartlett, Inc., Syosset, N. Y., consulting engineers, reports that net income in 1959 dropped 62% from 1958—$56,630 compared to $150,469.

Ford Bartlett, chairman and president, gives these two main reasons for the decline:

- A greater proportion of supervisory work in 1959 than in 1958.
- The substantial cost of a new promotional campaign launched by the company in 1959.

Last year, gross earnings of Lockwood, Kessler & Bartlett totaled $2.37 million, only slightly less than 1958's $2.38 million. But 25% of last year's volume was accounted for by supervisory services, compared to only 8½% in 1958.

Mr. Bartlett says that although "supervisory work is important to us—and we welcome it—the margin of income yield is generally smaller than for original engineering design."

The increase in the proportion of supervisory work was also "in large measure the result of a general decline in the volume of new engineering design business during 1959," Mr. Bartlett adds.

Lockwood, Kessler & Bartlett is not alone in reporting the lower profit margins yielded by supervisory services. Many consulting engineers acknowledge that such services bring small profits. But a majority of them also see an obligation to seek authority over construction for which they have assumed design responsibility (ENR Mar. 6, 1958, p. 25).

Although the drawback is generally admitted, the exact dollars and cents measure is rarely available. The Lockwood, Kessler & Bartlett report is therefore a revealing one. This stems from the company's unique position in the consulting profession. It is one of the few—perhaps the only—purely engineering consultant firm with stock held by the general public. It became a publicly held corporation last year (ENR Apr. 30, 1959, p. 78). From April through last week it was traded in the over-the-counter market, but this week, trading of the company's stock started on the American Stock Exchange.

Promotional and other business development and general administrative expenses rose more than $40,000 in 1959, from a 1958 total of $44,586 to $484,990 last year.

The increase in promotional costs stemmed largely from the assignment of more personnel to the job of obtaining new business. This brought with it an increase in traveling expenses.

In his report to stockholders, Mr. Bartlett says he is confident that the company will do better this year. Backlog at the first of the year was $2.47 million, or $378,000 more than the comparable period of 1959.

In addition, the promotional campaign is expected to "contribute materially to the growth" of the company's business, Mr. Bartlett reports. It has already resulted in obtaining the design contract for an urban arterial highway system for San Juan, Puerto Rico.

Equipment Orders Continue to Climb

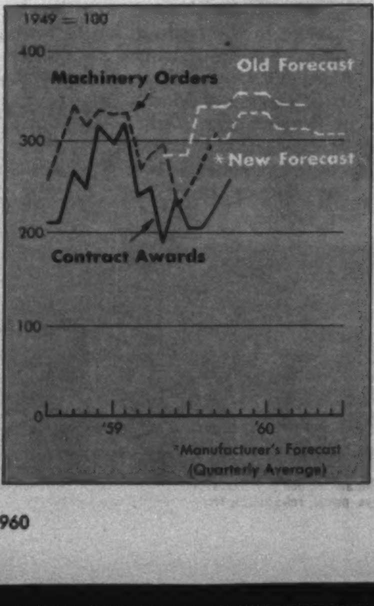
Construction equipment orders are living up to the high expectations of manufacturers. February orders for construction and mining equipment jumped 12% above January. For the second consecutive month, the dollar value of new orders set a monthly high.

The February New Orders Index rose to 309, based on average monthly dollar volume in 1959 as 100. This is about 4% above the previous February highs set in 1959 and 1951, according to the McGraw-Hill Economics Department.

While burgeoning orders for new machines reflect a rise in contractors' new business, orders continue to rise faster than contracts. This may be due to contractors seeing increasing evidence of a strong upsurge in contract volume. They are preparing for a record second quarter of new business.

Setting the stage for this expansion in new business was the sharp February-March rise. The March Contract Award Index leaped to 255, based on 1949 as 100. The latest index, which measures the trend in contracts reported by ENR, was 26% above the December-January rate of awards. The Contract Award Index will move up to much higher points during the next three months as highway, bridge, and probably industrial building contracts, climb well above the rate that was set during the first three months.

This surge will probably cut short the indications that some construction equipment manufacturers were temporarily adding to inventory faster than desired. Even though orders for the industry have been rising, some inventory buildup has been noted.



International Harvester reports its inventories definitely higher than usual for this time of year. The increase is attributed to the construction season being so late, which resulted in layoffs at I-H plants. A spokesman says "you can't keep building up unless your products keep moving out," and the move-out has been slow. But this month the construction season gets into full swing and a good month for the company is anticipated.

Allis-Chalmers reports that 1,200 persons were laid off about a month at its Springfield, Ill., plant. The inventory increase is considered normal at this time of year, however, and on rubber-tired lines a different picture exists. A New York City A-C distributor reports that there is a waiting period between order and delivery of rubber-tired equipment.

Caterpillar Tractors says inventories are not unusually high for this time of year and its inventory is about normal. So far this season, less than 100 workers have been laid off, and there has been little production cutback.

Supreme Court Limits Wage-Hour Law

Court rules reservoir work is not close enough to interstate commerce to require overtime pay

The U.S. Supreme Court gave the construction industry some relief last week from Labor Department efforts to extend the reach of the Fair Labor Standards Act.

It ruled that construction workers building a dam and impounding facilities on the lower Nueces River in Texas for the water supply system of Corpus Christi are not covered by the law.

The 5 to 4 ruling, written by Justice Felix Frankfurter, rejected arguments by Secretary of Labor James P. Mitchell that H. B. Zachry Co., contractor on the $6-million Mathis Dam, had to comply with the law's record keeping and overtime provisions.

Substance of the decision is that the construction work is not closely enough related to interstate commerce to bring it within the law's coverage.

The dam is to replace an existing, smaller dam further upstream. The City of Corpus Christi uses the entire output of the water system. Between 40% and 50% of the water consumption is by industrial users, most of whom are engaged in, or produce goods for, commerce. Users include railroads, trucking concerns, an airport and manufacturing companies.

Question was whether the use to which the completed facility would be devoted had a strong enough interstate commerce flavor to rub off on the construction work and taint it, in turn, with the aspects of "commerce."

The problem has troubled the construction industry ever since the law was passed in 1938. Under the law, contractors must pay time and one half for overtime in excess of 40 hours a week.

Congress made the law apply whenever employees are engaged in interstate or foreign commerce or in the production of goods for commerce. The courts have tried for 22 years to determine what puts a construction project in interstate commerce.

A few years ago, the Supreme Court established a vague test in the Vollmer case. It said the test is "whether the work is so directly and vitally related to the functioning of an instrumentality or facility of interstate commerce as to be, in practical effect, a part of it, rather than isolated, local activity." The court concedes it has construed the law liberally "to apply to the furthest reaches consistent with congressional direction."

The U.S. Labor Department has adopted the same policy.

In the Texas case, it reasoned that the workers on the reservoir were covered by the law and entitled to overtime pay in excess of $70,000 because they were, in effect, producing water that would be used by concerns engaged in commerce or producing goods for commerce.

The lower court disagreed and said the construction work was not closely related and directly essential to production of goods for commerce. The Labor Department appealed.

Justice Frankfurter concluded that work on the dam is "neither a facility of 'commerce' nor a facility of 'production'."

"The combination of the remoteness of this construction from production," he said, "and the absence of a dedication of the completed facilities either exclusively or primarily to production, persuade us that the activity is not 'closely related' nor 'directly essential' to production for commerce."

Justice Douglas, writing the dissent, said that "the liberal construction given the act (in earlier cases) is now forsaken." The majority ruling, he added, is a "backward step from the measures Congress designed to protect the lowest paid and weakest groups of wage earners in the nation."

The decision cannot be considered much of a victory for contractors or much of a comfort to them. Not only did the majority view prevail by a very narrow margin, but Mr. Frankfurter began to undo what the decision did by conceding that the majority opinions were "no doubt matters of the nicest degree"—an inevitable situation, he said, in the scheme and enforcement of the wage-hour law.

Labor in Brief . . .

• **Plasterers sued**—A group of contractors in the Los Angeles, Calif., area has sued seven locals of the plasterers union for antitrust violations. It claims that the labor contract the locals signed with the Contracting Plasterers Association compels nonmembers of the association to abide by its provisions in order for them to get workers from the union.

• **Union technicians**—A new breakthrough in the organization of technicians has been claimed by Walter Reuther's United Auto Workers in its organizing of Martin Co. workers at Vandenberg (Calif.) Air Force Base. The new contract for those workers provides a labor grade structure ranging from $2.10 to $3.75 an hour.

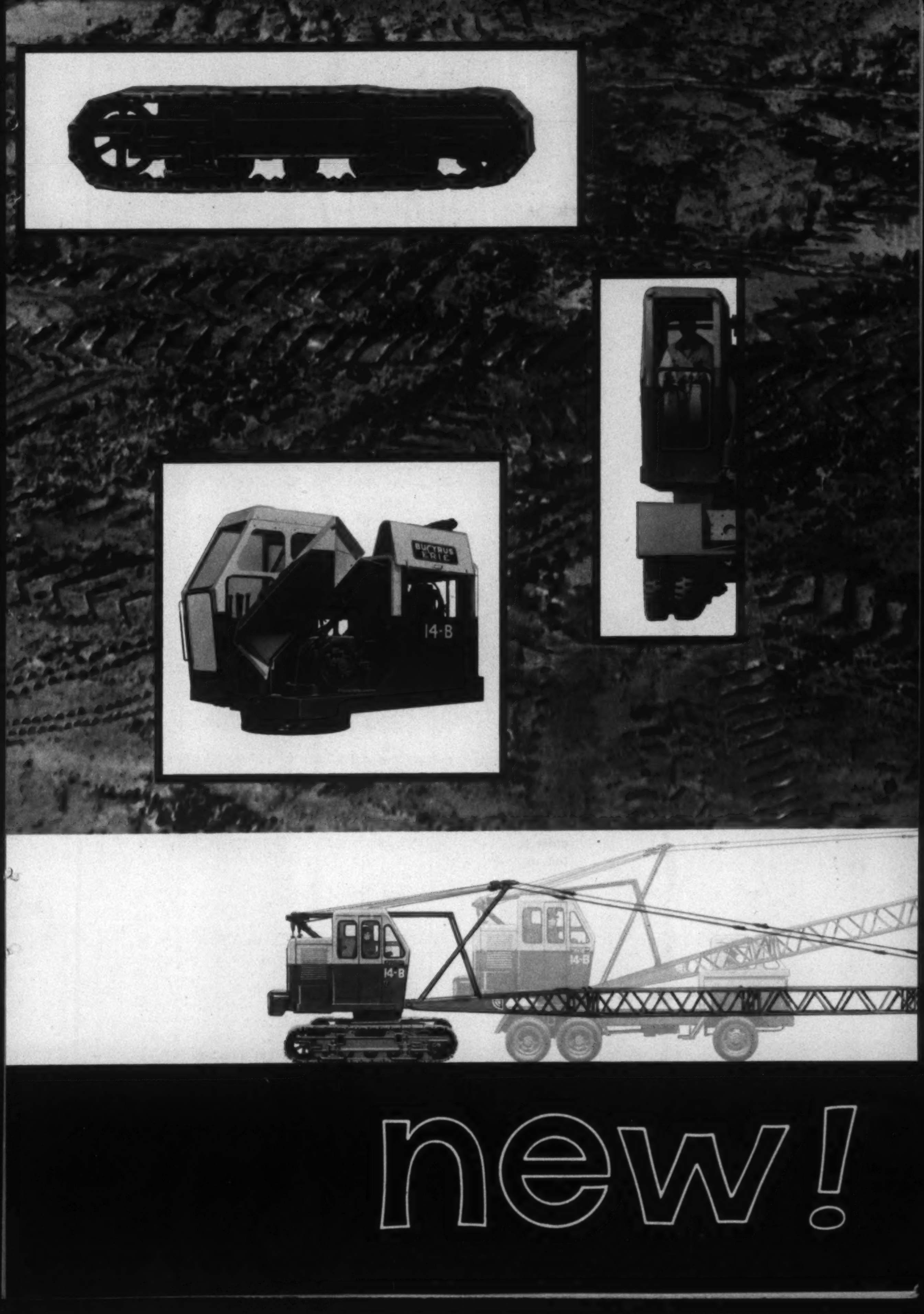
• **Jurisdictional dispute**—Work at the Atlas missile launching site near Cheyenne, Wyo., was stalled briefly earlier this month by jurisdictional dispute between teamsters and plumbers. Members of a local plumbers and steamfitters union claimed the work at transferring oxygen tanks from railroad cars to trucks.

• **Force account**—The Kentucky legislature has passed a bill tightening the state's force account law. New measure allows the highway department to use its own forces, without taking competitive bids, on road projects costing no more than $12,000.

• **Air Force base hit**—More than 3,000 construction workers honored picket lines and halted all construction work last week at the Vandenberg Air Force missile base in California. Electrical workers said their pickets were protesting one contractor's employment of electricians at less than the prevailing wage.

• **Dispute ends**—A jurisdictional dispute over metal roof deck installation work on the Civic Stadium in Buffalo, N. Y., stalled the $825,000 construction program for a week last month. Both the iron and sheet metal workers claimed the work.

• **To Washington**—The National Constructors Association, one of the nation's most active employer associations in construction labor relations, has moved to Washington, D. C. NCA was formerly headquartered in New York.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14-B
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the spectacular

BUCYRUS ERIE®

14-B

Here's a new machine — crawler- or truck-mounted — that will give you a whole new idea of machine classifications because *it spans a work range previously covered by 2 rigs!*

The spectacular new 14-B offers you features entirely new to the conventional type machine . . . features that mean bonus performance, faster setups, lowered maintenance costs, greater profits! They are all benefits designed into the machine by Bucyrus-Erie engineers, tested at their own Research and Development Center . . . PROVED on the job!

Take a close look at this new machine, then get the full story from your Bucyrus-Erie distributor!

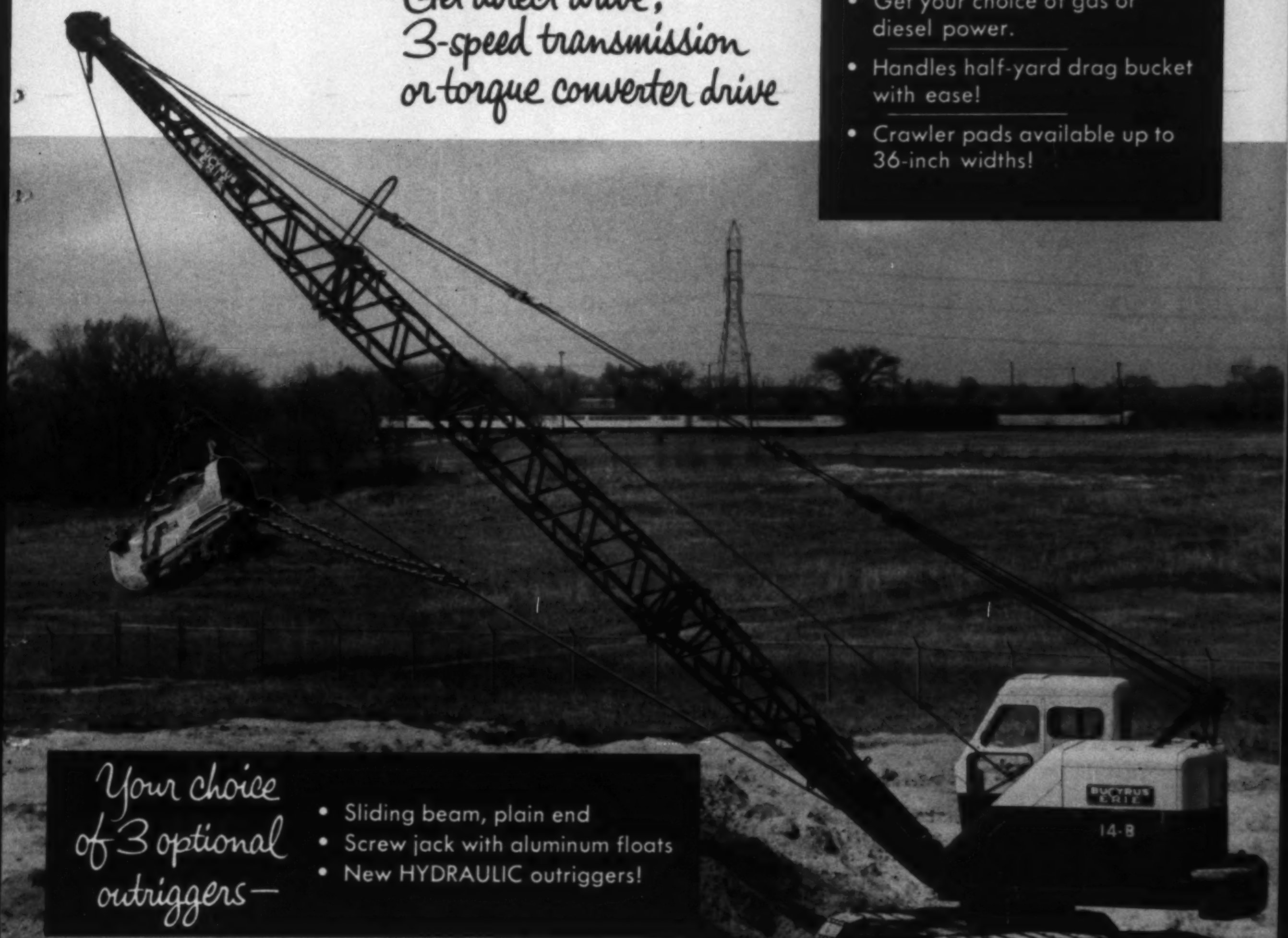
Full convertability to Hoe • Crane • Dragline • Clamshell • Shovel

These features are ALL available for the spectacular new 14-B!

- Simple MECHANICAL controls for the upper works . . . AIR power for steering and propell
- Ball bearing swing circle adjusted for life at the factory.
- Hi-vision cab that lets you see in all directions.
- Full-paneled cab for easy access all around.
- Enclosed gears on main machinery, running in oil.
- Color Code lube guide.
- Involute splined shafts throughout upper works and crawlers.
- Identical and interchangeable clutches and brakes on main shafts.
- 3-wrench standardized bolt sizes to make service easier.
- Air-powered QUICK-SHIFT, swing to propel on crawlers.
- Crawler OUTRIGGERS to boost standard crawler capacities by 15%.
- Remote lubrication grease gun for swing gear and pinion.
- Unit assemblies, easiest to service and maintain.

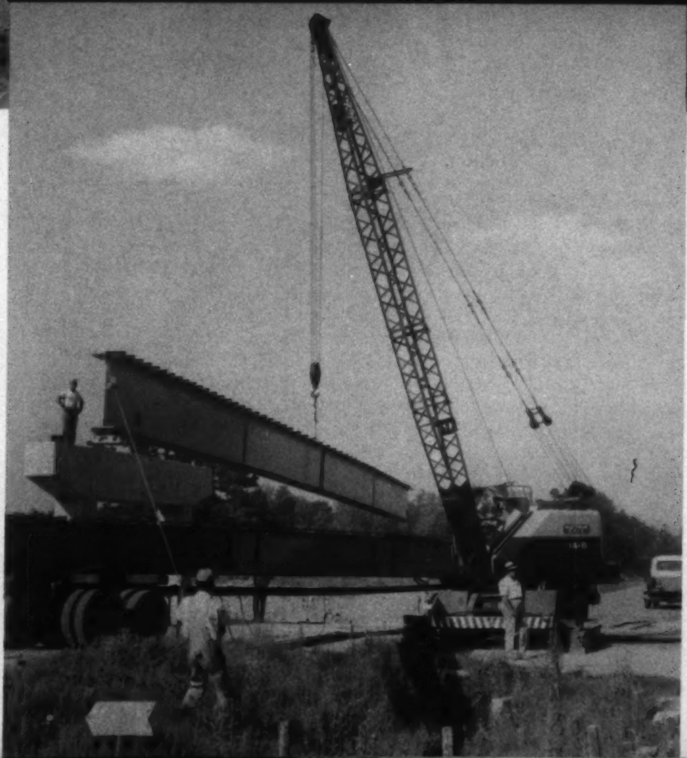
Get direct drive, 3-speed transmission or torque converter drive

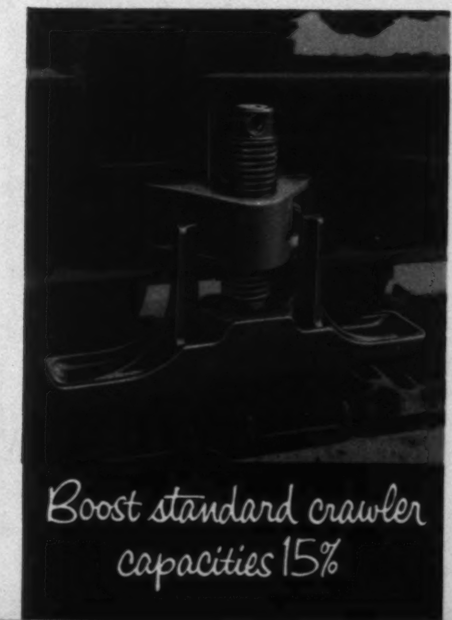
- Get your choice of gas or diesel power.
- Handles half-yard drag bucket with ease!
- Crawler pads available up to 36-inch widths!



Your choice of 3 optional outriggers—

- Sliding beam, plain end
- Screw jack with aluminum floats
- New HYDRAULIC outriggers!





Boost standard crawler capacities 15%

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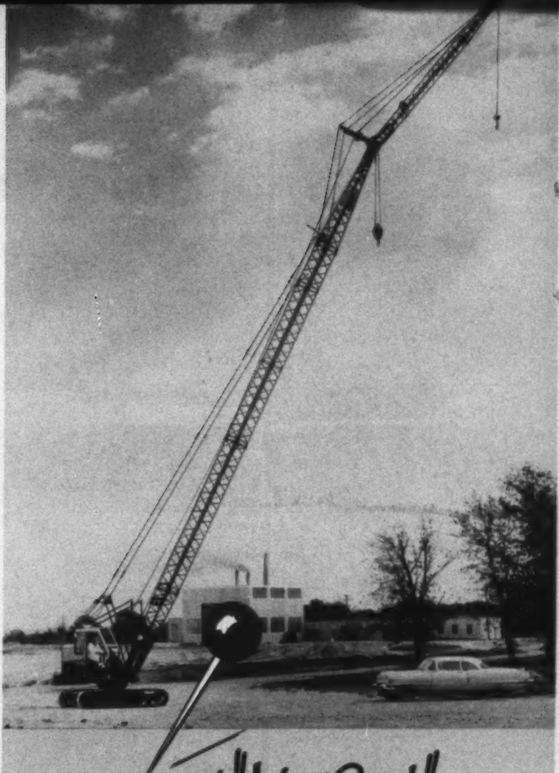
"Mr. Growing..."

The spectacular Bucyrus-Erie 14-B is *your* rig! Here's a machine that you buy at a "small machine" price . . . work at a "big rig" pace! The new 14-B takes you out of the small job class, too, and helps you grow because of the expanded work range you can tackle! Check the facts: "Big Job" lifting capacity; crawler hoe digs down beyond 17 ft with a *standard* boom and handle; it works a full half-yard dragline bucket with ease!



. . . and "Mr. Big!"

You never outgrow your need for the multi-purpose profit value of this versatile rig! You can eliminate "big rig waste" by assigning a new Bucyrus-Erie 14-B to dozens of lifting, digging jobs on every big contract. Efficient assignment of cranes and excavators is as important as materials and methods when you're planning a profit.

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Your Bucyrus-Erie distributor may not be the largest or the smallest equipment house in the territory . . . that isn't the point! He's a *qualified* Bucyrus-Erie distributor and *that is the point*. It's a big reason why you are making an investment in your future with Bucyrus-Erie.

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PLAN NOW TO MAKE AN INVESTMENT IN YOUR FUTURE WITH

BUCYRUS ERIE® . . . *most respected name in the industry*

South Milwaukee, Wisconsin

Rothman Rules on Hot-Cargo Ban

NLRB general counsel allows civil enforcement of a valid clause; limits exemption to on-site work

The construction industry's controversial hot-cargo contracts came up for their first legal interpretations last week under the new rules imposed by the Landrum-Griffin labor law.

The law does not prevent a union from attempting to enforce a valid hot-cargo clause by civil action. So ruled Stuart Rothman, general counsel of the National Labor Relations Board, in one case.

In another case, he ruled that a hot-cargo clause affecting off-site work is not within the Landrum-Griffin exemption and is illegal, void and unenforceable.

Significance of the rulings: They indicate the general counsel's office is satisfied with the House managers' interpretation of the hot-cargo section of the law.

At the time the Landrum-Griffin bill was passed, the House members who helped put it together said the construction industry's exemption related only to clauses affecting on-site work. They said, too, that the exemption did not change existing law with respect to judicial enforcement of such contracts or with respect to existing restrictions on strikes, boycotts or picketing to enforce them.

The Landrum-Griffin law makes it an unfair labor practice for a union and an employer to negotiate a contract clause committing an employer to refrain from doing business with another or from handling the products of another. It makes such hot-cargo clauses void except in the construction and apparel industries. The construction exemption is limited to "the contracting or subcontracting of work to be done at the site."

A wide difference of opinion has developed whether the exempted clauses can be enforced and as to the legality of restrictive clauses, which relate to off-site work.

Mr. Rothman's rulings go to the heart of the two issues.

In the first case, Avalon Construction Co. of Arlington, Calif., had subcontracted work on a Glen Avon construction project to an employer whose workers were represented by District 50 of the United Mine Workers. The local building trades council claimed this was a violation of the union security clause of the local labor agreement with Avalon. The clause was binding on subs.

The council threatened to sue Avalon for violation of the agreement. Avalon contended that this amounted to illegal coercion under the law's ban on enforcement of a hot-cargo clause.

Mr. Rothman held that the clause was legal and that civil action to enforce it is not prohibited by the labor law.

In the second case, however, Mr. Rothman found that the plumbers' fabrication clause in question was illegal because it related to off-site rather than on-site work. Clause required use of fixtures fabricated by plumbers.

In that case, R. A. Wiley and Sons, contractor on a Chula Vista, Calif., school project, purchased from the Acorn Engineering Co. shower fixtures that had not been made by members of the plumbers union. The local plumbers union persuaded the contractor to return the fixtures on the grounds their use violated the contract. Acorn then filed unfair labor practice charges against the union and the contractor.

Mr. Rothman agreed that the clause was void because it attempted to restrict the performance of off-site work. He requested that the company and the union be enjoined from giving effect to the clause.

Net result is that the law—until it is litigated—appears to be about where it was before the Landrum-Griffin bill was passed. Hot-cargo clauses—at least those covering on-site work—are valid but unenforceable, except for common law actions for breach of contract.

Glen Canyon Claim Is Denied

The government refuses to absorb any of the cost of wage increases incurred in settling long labor dispute

Merritt-Chapman & Scott last week lost its long-fought battle to have the government pick up 85% of the cost of an increase won from the company by construction unions on the Glen Canyon Dam on the Colorado in Arizona.

The cost of the increase may run to $5 million—all of which now comes out of Merritt-Chapman's pocket. The company had claimed that the government should compensate for this increase under provisions in its contract calling for escalation payments for any increase in wages.

However, the 50 cents an hour over basic Arizona rates paid to five construction trades by the company after a long strike was questioned by the Bureau of Reclamation. Reclamation officials claimed that in fact the amount of the increase was actually compensation for subsistence at a remote site—and that such payments do not qualify for government compensation under the wage escalation clause.

The high points of the controversy run something like this:

Merritt-Chapman won the $108-million construction contract back in 1957, over several other bidders.

In January, 1959, an arbitrator ruled that Merritt-Chapman no longer had to pay subsistence allowances because the project would no longer be considered a "remote area."

When told that free room and board would cease, the workers struck for a short time.

Then, beginning in June, 1959, a new statewide agreement was negotiated between Arizona contractors and the building trades. This agreement provided for subsistence payments at all work sites outside of 12 Arizona cities. Merritt-Chapman wanted the Glen Canyon site specified, but did not get this written into the agreement.

The company was willing to accept all provisions of the new state agreement except for allowance pay, and pointed out that it had spent some $2.5 million in facilities at Glen Canyon to remove the "remote status."

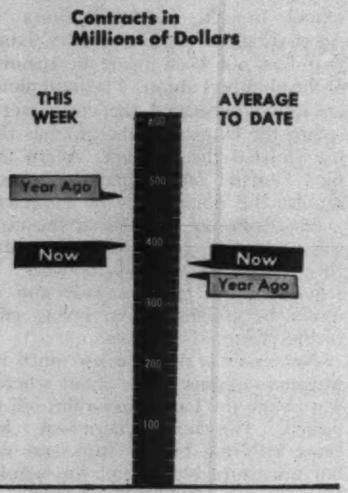
Finally, Merritt-Chapman agreed to the extra 50 cents an hour—but it called this a wage increase.

Then the company asked the Bureau of Reclamation to approve the wage increase under its escalation clause. The bureau asked the General Accounting Office for a ruling.

Both the Bureau of Reclamation and the General Accounting Office have concluded that the payment by the contractor was a subsistence allowance "under the guise of an increase in wage rates."

Construction Scoreboard

This Week . . .



AMOUNT OF CONTRACTS LET

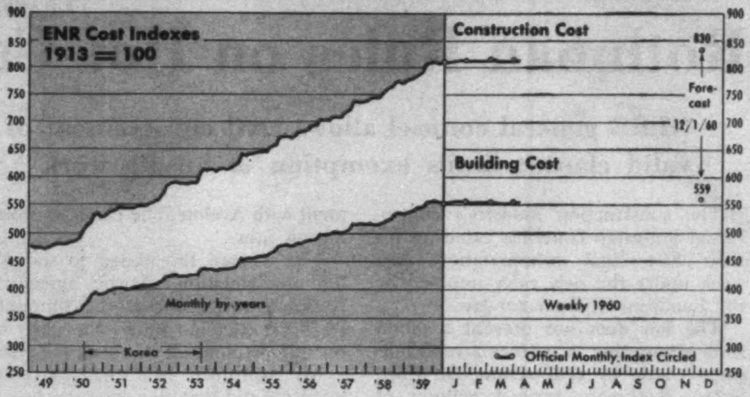
Contracts Awarded In 50 States By Type	This Week millions	Cum. 15 wks 1960 millions	Chge '59-'60 %
All Heavy Construction	$397.8	$5,422.7	0
By Ownership			
PRIVATE	171.4	2.822.9	+ 8
PUBLIC	226.4	2,599.8	− 8
State & Municipal	196.2	1,971.4	+ 2
Federal	30.2	628.4	−29
By Type of Work			
PUBLIC			
Waterworks	3.3	83.5	−32
Sewerage	9.3	153.0	− 4
Bridges*	20.9	285.4	+61
Highways	100.2	783.1	+ 4
Earthwork, Dams & Waterways	15.7	186.8	−24
Buildings:			
Excl. Housing	47.2	597.2	−19
Housing	12.8	137.8	−20
Unclassified	17.2	374.4	−18
PRIVATE			
Buildings:			
Mass Housing	75.4	1,293.5	+18
Commercial	40.0	599.4	− 6
Industrial	40.5	625.5	−17
Unclassified	15.3	303.1	+157

*Includes Private bridges

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

New Construction Capital . . .

	Week of Apr. 7 millions	Cum. 14 wks 1960 millions	Chge '59-'60 %
Corporate Securities	$ 33.7	$ 694.5	−31
State and Municipal:			
All Except Housing	108.1	1,794.8	+ 8
Housing	....	13.6	−56
Federal Loans	3.9	52.0	+63
Federal Aid	....	....	....
Total Nonfederal	$145.7	$2,554.9	− 7
Federal Appropriations:			
Projects in U. S.	....	....	....
Outside U. S.	....	....	....
Total New Capital	$145.7	$2,554.9	− 7



ENR INDEXES (1913=100), 20-cities' average	Week of Apr. 7 1960	% Change from Mar. 10 1960	% Change from Apr. 9 1959
Construction Cost	815.59	+0.28	+3.80
Building Cost	557.24	+0.39	+2.68

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3 518.

Latest Month . . .

CONTRACTS AWARDED

	1960 March (millions)	1960 3-Mos. (millions)	Percent Change from 1959 Mar.	Percent Change from 1959 3-Mos.
Total U. S. (50 States)	$2,001.4	$4,668.7	+21	+ 1
Private	1,025.8	2,475.8	+22	+ 9
Public	975.6	2,192.9	+ 7	− 6
State and Municipal	712.3	1,635.5	+21	− 2
Federal	263.2	557.4	+18	−16
ENR Volume Index, 1913=100	533	484	− 9	− 6

NEW CONSTRUCTION CAPITAL

Total U. S. (50 States)	968.2	2,409.1	+ 3	− 4
State and Municipal Bond Sales	582.9	1,700.3	+ 3	+ 3
Corporate Security Sales	348.0	660.7	+31	−21
Federal Loans, Aid (nonfederal work)	37.3	48.1	+225	+69
Federal Appropriations, (federal work)	....	....	....	....

MATERIALS SHIPMENTS

		1960 Jan. (J) Feb. (F)	1960 Cum. (No. of Mos.)	Percent Change from Year Ago Mo.	Percent Change from Year Ago Cum.
Portland Cement, Bur Mines	thous bbls	16,080(F)	34,749(2)	− 4	− 2
Concrete Paving Awards, PCA	thous sq yd	5,961(F)	13,371(2)	−12	−15
Fabricated Structural Steel	thous tons	241(F)	450(2)	+11	+ 2
Bookings, AISC	thous tons	289(F)	510(2)	− 2	− 4
Reinforcing Bars, Net, AISI	thous tons	140(F)	320(2)	− 1	+16
Lumber, NLMA	mil fbm	2,798(F)	5,296(2)	+ 4	+ 2
Orders	mil fbm	2,787(F)	5,491(2)	+ 2	− 2
Production	mil fbm	2,924(F)	5,605(2)	+11	+ 6
Clay Products, Bureau of Census					
Brick, Unglazed, Common, Face	mil bri	352.0(J)	352.0(1)	− 4	− 4
Vitrified Clay Sewer Pipe	thous tons	109.2(J)	109.2(1)	+ 8	+ 8
Structural Tile, Unglazed	thous tons	34.3(J)	34.3(1)	−10	−10
Asphalt Products, Bureau of Census					
Asphalt Roofing	thous sales sqs	2,646.3(J)	2,646.3(1)	− 2	− 2
Asphalt Siding	thous sales sqs	53.4(J)	53.4(1)	− 2	− 2
Aluminum, Wrought, Net, Bur Census					
Sheet and Plate (non-heat treatable)	mil lbs	96.5(J)	96.5(1)	+13	+13
Wire and Cable	mil lbs	22.5(J)	22.5(1)	−15	−15
Extruded Shapes (soft alloys)	mil lbs	65.7(J)	65.7(1)	+11	+11

EMPLOYMENT AND FAILURES

Contract Const Employment, BLS	thous	2,377(F)	2,412(2)	**+ 5	+ 5
Contractor Failures, Dun & Bradstreet					
Number		195(F)	388(2)	+19	+10
Liabilities	thous	$10,770(F)	$22,763(2)	+56	+50

** Average per month

Builder's Liability Limited

With some exceptions, contractor is not liable for injury to third party after owner accepts his work

In the absence of special circumstances, a contractor is not liable to third parties for injuries resulting from his work after it has been accepted by the owner.

The relative liabilities of an owner and his contractor are illustrated by the following Illinois case.

An action was brought to recover damages resulting from the breaking of a glass door.

The action was brought against the owner, tenant and the contractor who had installed the door.

The circumstances of the installation were that the door was part of a remodeling job done by the owner. The architect employed by the owner had specified tempered glass for use in the door and this type of glass was available to the contractor. The owner, however, instructed the contractor to install plate glass because this was cheaper, even though it was not as strong as the tempered glass.

The testimony produced at the trial indicated that the plate glass is polished on both sides after it is drawn; that it scratches more easily than tempered glass; that contact with plate glass by bodies, clothing, purses and other objects would create a tendancy for surface abrasions or roughening which reduces its strength; that when it breaks it shatters in sharp edged pieces.

On the other hand, tempered glass is strongest of the types of glass; it is five times stronger in flexure and impact resistance; it is very difficult to scratch and is so tough it can be struck with a hammer without breaking; when it does break it breaks within itself and is not strewn out, and the broken parts have rounded edges and are quite harmless in contrast to sharp jagged edges of broken plate glass.

The trial court dismissed the action but the appellate court[1] reversed the judgment and ordered a new trial holding that it was up to the jury to determine if the owner was negligent in selecting the type of glass door to be used.

The appellate court indicated that the contractor that had installed the door had the status of a contractor employed by the owner. "It is a well established general rule that, where the work of an independent contractor is completed, turned over to, and accepted by the owner, the contractor is not liable to third persons for damages or injuries subsequently suffered by reason of the condition of the work, in the absence of special circumstances. 65 C.J.S. Negligence, Section 95(b), page 613; Colbert v. Holland Furnace Co., 333 Ill. 78, 164 N.E. 162, 60 A.L.R. 353; Paul Harris Furniture Co. v. Morse, 10 Ill. 2d 28, 139 N.E. 2d 275.

"There are well recognized exceptions to the general rule, one of which is that the contractor is liable where the work is inherently or intrinsically dangerous. 65 C.J.S. Negligence, Section 95 (b), page 614; Paul Harris Furniture Co. v. Morse, 10 Ill. 2d 28.

"It is the general rule that a landload who has relinquished full control and possession of demised premises to a tenant, ordinarily is not liable for personal injuries suffered by a third person because of the tenant's negligence or because of the defective condition of the premises arising after the beginning of the lease. I.L.P. Landlord and Tenant, Section 309, and cases there cited.

"The basic reason for the rule is that, assuming that the premises are in good condition when leased, as the law grants possession thereof to the tenant, the landlord's right of entry and possession being suspended during the term, if during the term, through the fault of the tenant the premises become unsafe, the tenant and not the landlord is liable to the third person by reason of the defective condition.

"This rule is subject to many exceptions. Thus where a landlord assumes to repair or improve leased premises even though not obliged to do so, he thereby becomes subject to the duty of acting carefully if he acts at all. A landlord in this situation is not charged with liability on the basis of nonperformance. He is charged with liability because having chosen to perform he has thereby become subject to a duty in respect of the manner of performance. Roesler v. Liberty National Bank of Chicago, 2 Ill. App. 2d 54, 118 N.E. 2d 621; see annotation, 150 A.L.R. 1373."

(1) Watts v. Bacon & Van Buskirk Glass Co., 155 N.E. 2d 333, Appellate Court of Illinois, Dec. 22, 1958.

OFFICIAL PROPOSALS

Bids: April 29, 1960

Installation of a Thirty Horsepower Gas Fired Steam Generator

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
FEDERAL BUILDING

CONTRACT O&M 585

Sealed proposals for furnishing and installing a thirty horsepower gas fired steam generator and associated equipment and piping in the Federal Building, New York International Airport will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, N. Y., until 11:00 A.M., Friday, April 29, 1960, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon request.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, April 14, 1960

District of Columbia—Highway Construction—Dept. of Hwys. & Traffic, March 25, 1960. CONSTRUCTING THE DISTRICT OF COLUMBIA ABUTMENT FOR THE THEODORE ROOSEVELT BRIDGE, CONTRACT NO. 2, Federal Aid Interstate Project No. I-66-1(6)0, Invitation No. C-60125-H, consisting of approx. 3,122 cu. yds. Class B Concrete in footings; 2,698 cu. yds. Class B Concrete in Abutment Wall; 20,100 Lin. Ft. Concrete filled pipe piles; 1,188 Cu. Yds. Regular coursed, dressed dimension granite masonry, including backing concrete; and 1,670 cu. yds. Broken course dressed granite masonry, including backing concrete. Wage Rates have been predetermined by Labor Dept. "Pre-bid meeting will be held to answer questions bidders may have on the project on April 12, 1960, 9:00 A.M., E.S.T., Room 500, District Building, 14th and E Sts., N.W., Wash. 4, D. C." Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Division, Procurement Office, D. C., Room 404, 499 Penn. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to D. C. Treasurer (Phone NA 8-6000, Ext. 2378). SEALED BIDS to be opened 3:00 PM, EST, April 21, 1960, in Room 424, 499 Penn. Ave. N.W.

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-5278) will be received at Denver, Colorado, until 2 p.m., Mountain Standard Time, May 24, 1960, for furnishing two (2) vertical shaft, Francis-type, hydraulic turbines, including two interchangeable runners for each turbine, one rated 85,000 horsepower at 426-foot head and the other rated 70,000-horsepower at 334-foot head for Trinity Powerplant, Central Valley Project, California. Delivery is desired within 630 days. For particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5302) will be received at McCook, Nebraska, until 10 a.m., Central Standard Time, May 24, 1960, for furnishing labor and materials for Red Willow Dam, Missouri River Basin Project. Location about 10 miles north of McCook, Nebraska. Principal items are 3,490,000 cu. yds. of excavation for foundation, from structures and from borrow; 8,300 cu. yds. of concrete; installing 3 high-pressure gates; and other work. Completion time 600 days. For particulars, address Bureau of Reclamation, P. O. Box 737, McCook, Nebraska; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

OFFICIAL PROPOSALS

Bids: April 21, 1960.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, and Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A. M., eastern standard time on the 21st day of April 1960, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No 1, G L Nickerson, District Engineer 353 Broadway, Abany 1 New York						
Albany	FASS 60-4 PSC 18538	Fuller Road C R 156, Elm of Grade Crossing of the NY.C. Railroad with the Fuller Road, C.R 156 Project S-568(1)	1.95	9" Cem Conc Pavt 40'; 48' & Var=1 72 Miles; Asph Conc=0.23 Mi.; RRGS-NYCRR-Plate Girder Span 62.0'	$93,000 Plans $5	$1,691,000
Rensselaer & Washington (Rte. 40)	FARC 60-27	Schaghticoke-Middle Falls, Pt. 1, S H 8350 Schaghticoke-Middle Falls Pt. 2, S.H. 8350 Project F-504(11)	7.98	Asphalt Concrete	$84,000 Plans $5	$1,531,000
Rensselaer (Rte. 67)	RC. 60-43	North Hoosick White Creek Station S.H 1792	4.05	Asph. Conc.=4.03 Mi Misc. Work=0.02 Mi.	$8,000 Plans $5	154,000
Rensselaer (Rte. 7)	R.C. 60-42	Whitehouse Bridge-Vermont State Line, S.H. 1426	3.92	Asphalt Concrete	$7,000 Plans $5	133,000
DISTRICT No. 2, L. Ketchum, District Engineer 109 No. Genesee Street, Utica 1 New York						
Herkimer (Rte. 28)	FARC 60-22	Richfield Springs-Getman Corners, Pt. 2, S.H 1818 Project S-493(1)	6.17	Asph. Conc Type 1A=6.12 Mi. Misc. Work=0.05 Mi.	$51,000 Plans $5	928,000
Madison & Oneida (Rte. 31)	FATS 60-5	Oneida Lake-South Bay, Oneida-South Bay, Pt. 2; S.H. 1361; Canastota-South Bay, S.H. 812; Oneida Valley-State Bridge, Pt. 1. S.H. 8367; Oneida Valley-State Bridge, Pt. 2, S.H 8367; State Bridge-Verona Sta., SH. 8432 Project F-540(3)	7.12	Traffic Signs	$350 Plans $5	6,500
DISTRICT No 3, E E Towlson, Acting District Engineer, 333 E Washington Street, Syracuse, New York						
Cayuga (Rte. 34)	FARC 60-34	Fleming-Scipio, Pt 2, S.H. 1327A Venice Center-Genoa, S.H. 1414 Project F-1155(3)	8.92	Asphalt Concrete	$23,000 Plans $5	421,000
Cayuga (Rte. 34)	FARC 60-36	Genoa-North Lansing, S.H. 1566 Project F-1155(1)	4.95	Asph. Conc., Type 1A Conc. Box-Twin Span 15' Each	$47,000 Plans $5	830,000
Cayuga (Rte. 34)	FARC 60-1	Weedsport-Cato, S.H. 686 Project F-1114(6)	0.48	Grading & Drainage	$13,000 Plans $5	242,000
Tompkins (Rte. 13)	R.C. 60-47	Cayuta-Newfield, S.H. 5474 Ithaca-Newfield, S.H. 5214	1.85	Asphalt Concrete	$3,000 Plans $5	53,000
Wayne (Rte. 31)	FARC 60-37	Pittsford-Palmyra, Pt. 4, S.H. 1551 Project F-744(7)	1.87	Asphalt Concrete	$5,500 Plans $5	100,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, State Office Bldg., 65 Court Street, Buffalo 2, New York						
Erie (Int Tour Rte. 190)	N.T. 60-1	New York State Thruway, Niagara Section Sub N-8S (South Grand Island Bridge and Approaches)	1.40 (0.34 Acc)	9" Cem. Conc. Pavt. 25' & Var.=1.26 Mi. (Plus 0.34 Mi Conc Access); Misc Work=0 14 Mi ; Cant Deck Truss & Gird Br 27 Sp 3383 1' Toll Plaza & Facilities	$435,000 Plans $100 Full Size Only	7,925,000
DISTRICT No 6, J H Thomas, District Engineer, State Office Bldg, 30 West Main Street, Hornell, New York						
Allegany (Rte. 21)	R C 60-35	Andover-Alfred Station-Almond, S H 5502	6.61	Asph Conc =4 61 Mi Misc Work=2 00 Mi	$22,000 Plans $5	397,000
Schuyler (Rte. 224)	FARC 60-31	Montour Falls-Alpine, Pt 1 S H 1232; Montour Falls-Alpine, Pt 2 S H 909; Odessa-Mecklenburg, Pt 1 S H 1655 Project F-FG-479(15), F-400(6)	4.55	Asph Conc =4 54 Mi ; Misc Work=0 01 Mi ; Cant Welded Girds Comp 3 Pc 290 5' Total; R R G S Single Span Pl Gird 84 2'	$116,000 Plans $5	2,107,000
Steuben	FASS 60-22	Purdy Creek-Shovel Hollow C R 28 Project S-541(1)	0.61	Asphalt Concrete	$7,000 Plans $5	120,000
DISTRICT No 7, R W Sweet, District Engineer, 444 Van Duzee Street, Watertown, New York						
Jefferson (Rtes. 11, 12, 37)	T C 60-2	Watertown-Clayton, Pt 1 S H 5140 Watertown-Theresa, Pt 1 S H 565 Watertown-Philadelphia, Pt 1 S H 5651	....	Traffic Signals	$500 Plans $5	$8,500
District No 8, K G Rauer, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Columbia	FASS 60-3	Old Chatham-Rayville-Brainart, C R 78 Project S-569(1)	4.67	Calcium Chloride Treated Stabilized Gravel	$30,000 Plans $5	548,000
Columbia & Dutchess	R C 60-29	24 various Highways in District 8 on Routes 9G, 82A, 343, 82, 52	91.2	Subsealing Cem Conc Pavt	$6,000 Plans $5	106,000
Orange & Ulster	R S 60-28	19 Various Highways in District 8 on Routes 6, 9W, 17A, 32, 52, 84, 94, 207, 209, 210	83.63	Subsealing Cem Conc Pavt	$6,000 Plans $5	103,000
Westchester (Int. Tour Rte 87)	FITATS 60-1	New York State Thruway Southern Westchester Conn Sub 11 (N Y City Line-Tuckahoe Road) Hudson Section-Sub. 10 (Tuckahoe Rd. Tarrytown) Project I-87-2(15)	11.00	Traffic Signs	$9,000 Plans $5	159,000
DISTRICT No 9, J C Frederick, District Engineer, 71 Frederick Street, Binghamton, New York						
Broome (Int. Tour Rte. 81)	FITS 60-4	Interstate Route 505 S H No Fish 60-3P (Pennsylvania State Line to Route 17 at Five Mile Point) Project I-81-1(7)	7.49 (3.54 Acc)	Traffic Signs and Delineators	$1,600 Plans $5	28,000
Broome (Int. Tour Rte 81)	FISH 60-3P	Interstate Route 505 Pennsylvania State Line-Five Mile Point (Penn -N Y State Line to Sunset Drive) Project I-81-1(6)	7.49 (1.24 Acc)	9" Cem Conc Pavt 2 @ 24' Var =7 29 Mi ; Misc Work=0 20 Mi (Access Cem Conc Pavt 0 77 Mi ; Asph Conc 0 47 Mi)	$145,000 Plans $5	2,645,000
Broome (Rte. 79)	R C 60-48	River Road-Windsor, Pt 2, S H 213; Ouaquaga Road, S H 212; Harpursville-Ouaquaga, S H 1106	4.77	Asphalt Concrete	$11,000 Plans $5	187,000
Delaware (Rte. 10)	FARC 60-32	Walton Village: Delaware St, S H 9268; Rock Rift-Colchester, S H 1271; Colchester-Delancey, S H 1272 Project F-845(5)	5.56	Asphalt Concrete	$70,000 Plans $5	1,187,000
Delaware (Rel. Rte 10)	BWS 60-2	City of New York: Board of Water Supply Road No 1 (Cannonsville Reservoir)	6.04 (1.23 Acc)	Asph Conc =7 17 Mi Misc Work=0 10 Mi	$190,000 Plans $5	3,436,000
Delaware (Rte. 30)	R C 60-40	Roxbury-Grand Gorge, S H 5459	5.66	Asphalt Concrete	$14,000 Plans $5	235,000
Sullivan (Rte. 17)	FATS 60-6	Monticello-Liberty, Pt 1 S H 5035 Monticello-Liberty, Pt 2 S H 5322 Project F-336(21); F-495(15)	8.02 (7.03 Acc)	Traffic Signs and Delineators	$3,000 Plans $5	51,000
DISTRICT No 10, M E Goul, District Engineer, 325 W Main Street, Babylon, L I ; New York						
Suffolk	SSPRC 60-1	Southern State Parkway (Captree State Parkway to Heckscher State Parkway)	1.37 (1.43 Acc.)	8" Cem Conc. Pavt. 2 @ 37.5' & Var.=1.28 Mi.; Misc. Work=0.09 Mi.; Acc. 8" Cem. Conc. Pavt.= 1.43 Mi; 5 Hwy. Gr. Seps. 2 Conc. Rigid Frames 70' & 67' 2 Comp. WF Beams 67.8' & 73.4'; 1 Plate Girder 109' Span	$195,000 Plans $5	3,557,000

(Continued on following page)

OFFICIAL PROPOSALS

(Continued from preceding page)

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: April 28, 1960

Resurfacing Taxiway Z

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
CONTRACT O&M 571

Sealed proposals for resurfacing portions of Taxiway Z at New York International Airport will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, New York, until 11:00 A.M., Thursday, April 28, 1960, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt will be issued. The receipt is then to be delivered to the Department of Purchase and Administrative Services, who will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, April 14, 1960

Contractors Watch
This Section —

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

OFFICIAL PROPOSALS

Bids: May 3, 1960

Alterations to Sixteenth Floor Dining Rooms

THE PORT OF NEW YORK AUTHORITY
PORT AUTHORITY BUILDING
CONTRACT EXD-120.074

Sealed proposals for performing alterations including the furnishing and installation of air conditioning equipment on the sixteenth floor of the Port Authority Building at 111 Eighth Ave., 15th Street, New York 11, N. Y., will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, May 3, 1960, at which time said proposals will be opened and read in Room 1108.

Contract Documents may be seen at the office of the Assistant Chief Engineer for Design of the Authority, Room 1115, and copies will be furnished upon request. No deposit will be required but the documents shall be returned in good condition not later than forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, April 14, 1960

District of Columbia—Trunk Watermain Construction—Dept. of Sanitary Engineering, D. C., March 30, 1960. CONSTRUCTION OF SOUTHEAST RELIEF WATERMAIN, SECTION II, 11th and M Sts. to 15th and Pa. Ave., S.E., consist. of approximately 325 lin. ft. 60" dia. and 550 lin. ft. 54" dia. Watermain; 45 lin. ft. 54" dia. watermain jacked in place; 190 lin. ft. 48" dia., 2,265 lin. ft. 36" dia., 360 lin. ft. 30" dia., 105 lin. ft. 12" dia., & 100 lin. ft. 8" dia. watermain and 150 lin. ft. 6" and smaller watermain, (Invitation No. C-60116-S). Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Division, Procurement Office, D. C., Rm. 404, 499 Pa. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to D. C. Treasurer. (Phone NA 8-6000, Ext. 2378). SEALED BIDS to be opened 3:00 PM, EST, April 22, 1960, in Rm. 424, 499 Pa. Ave., N.W.

OFFICIAL PROPOSALS

Bids: April 28, 1960

Installation of Underdrains and Pavement For a New Runway

The Lehigh-Northampton Airport Authority will receive sealed Proposals for the installation of underdrains and pavement for a new 5000 foot long runway. Proposals will be received by the undersigned until 1:30 P.M. (E.D.S.T.) April 28, 1960 at the Office of the Chief Clerk of the Lehigh County Commissioners, Court House Annex, 523 Hamilton Street, Allentown, Pa.

Copies of the Plans, Specifications and Proposal Forms can be obtained at the office of G. Edwin Pidcock Co., Consulting Engineers, 546-548 Hamilton Street, Allentown, Pa., upon payment of Thirty Dollars ($30.00) for each set. Any Bidder, upon returning such set in good condition within ten (10) days after the opening of the Proposals, will be refunded Fifteen Dollars ($15.00) of his payment.

The work under this contract shall be done in accordance with the "Standard Specifications for Construction of Airports" (Federal Aviation Agency) as published by the United States Government Printing Office in June 1959. Copies of these Specifications can be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., at a price of $2.75 each.

Each Bidder must deposit with his Proposal, a certified check or surety company's bid bond in an amount of not less than five (5) percent of the Total Bid as defined in the Instructions to Bidders.

Proposals must be submitted in duplicate on the prescribed forms provided, and in accordance with the Instructions to Bidders. No Bidder may withdraw his Proposal within thirty (30) days after the actual date of the opening thereof. The Lehigh-Northampton Airport Authority reserves the right to waive any informalities in, or to reject any or all Proposals.

The minimum wages paid all labor employed on this project shall be as tabulated in the Specifications and as approved by the Secretary of Labor of the United States.

Raymond H. Jackson
Secretary, Lehigh-Northampton
Airport Authority

EDWIN K. KLINE, JR., Solicitor

U. S. Government

United States Department of Commerce, Bureau of Public Roads, April 8, 1960, Invitations to bid have been issued by the Inter-American Highway Office of the Ministry of Public Works, Republic of Costa Rica, for COSTA RICA PROJECT NO. 9 ON THE INTER-AMERICAN HIGHWAY FROM SAN ISIDRO DEL GENERAL TO THE PANAMA BORDER.

Bids will be opened at 3:00 p.m., May 9, 1960 in the office of the Minister of Public Works, in San Jose, Costa Rica.

The project consists of the construction of 39 bridges and other related work including the construction of approximately 20 kilometers of Special Sub-base.

The work is divided into three parts as follows:

PROJECT 9-A: which includes the construction of 10 bridges and related work.

PROJECT 9-B: which includes the construction of 9 bridges and related work.

PROJECT 9-C: which includes the construction of 20 bridges and related work and the construction of the 20 kilometers of Special Sub-base.

Bids will be accepted on the basis of two alternates and award will be made on the most advantageous combination to the Government of all acceptable bids received. Bidders will be allowed to participate in either or both alternates:

ALTERNATE NO. I:

Separate bids may be submitted for any one or any two of the three projects with the understanding that they may be awarded separately.

ALTERNATE NO. II:

A separate bid may be submitted for all three projects combined.

U. S. Government

Bids must be submitted in Spanish which will be the official contract language; an English translation of all provisions and bidding documents will be furnished by the Government but this translation will have no official status. Standard Specifications and bridge plans will be in English only.

Bids will be accepted only from Costa Rican or United States Contractors who have an acceptable record of performance in highway and/or bridge construction in Costa Rica or the United States.

Plans, specifications, special provisions and forms may be examined at the Inter-American Highway Office (Direccion de la Carretera Interamericana), 4th floor, Rex Building, San Jose, Costa Rica or in the Inter-American Highway Office, Bureau of Public Roads, Room G-13C, General Services Bldg., Washington 25, D. C.

Plans, specifications, special provisions and forms may be obtained only from the Inter-American Highway Office (Direccion de la Carretera Interamericana) in San Jose, upon the deposit of $100.00 for each complete set for Project 9; a deposit of $50.00 will be required for each complete set for anyone of Projects 9-A, 9-B and 9-C. Bidders will be refunded 80% of this amount upon the return of the plans and standard specifications in good condition during the following 30 days after official award of contract.

The most important quantities of work are:

Item name	Unit	Project 9-A	Project 9-B	Project 9-C
Excavation for structures (bridges)	Cu. Yds.	14,000	13,000	15,600
Structural steel piles, furnished	Lin. Ft.	....	3,600	....
Precast concrete piles, furnished	Lin. Ft.	....	....	18,600
Structural steel piles, driven	Each	....	84	....
Precast concrete piles, driven	Each	....	....	513
Class "A" concrete	Cu. Yds.	6,700	6,600	9,500
Reinforcing steel	Lb.	971,000	1,016,000	1,527,000
Structural steel, erected only	Lb.	1,305,000	2,435,000	1,770,000
Special sub-base	Cu. Mts.	700	900	72,000

OFFICIAL PROPOSALS

Bids: April 21, 1960.

Cohoes Housing Project

INVITATION FOR BIDS

The Cohoes Housing Authority will receive separate sealed bids for the following contracts for work to be done in connection with Cohoes Housing Project No. 22-1 situated in Cohoes, New York.

CONTRACT NO. 1
GENERAL CONSTRUCTION WORK
CONTRACT NO. 2
PLUMBING, GAS FITTING AND KINDRED WORK
CONTRACT NO. 3
HEATING WORK
CONTRACT NO. 4
ELECTRICAL WORK
CONTRACT NO. 5
LAWNS AND PLANTING

at April 21, 2:00 P.M., Local Time.

In the office of the Cohoes Housing Authority, Cohoes, N. Y. at which time and place all bids will be publicly opened and read aloud if two or more bids are received for each contract. If only one bid is received for any contract, it will be returned unopened.

The work, which is divided under prime contracts as noted above, consists of construction of row housing on two separate sites as follows:

a. Polo Grounds Site—10 two story row houses, consisting of 50 dwelling units and a management building, wood frame construction with brick-veneer exteriors, generally.
b. Saratoga Street Site—12—two story buildings and a management building, and other work as described for Polo Grounds Site.
c. The work of both sites will be awarded by single lump sum bid which will include both sites.

The work includes clearing of the entire site, excavating, fill and grading being included in the General Construction Contract No. 1: the work also includes grading, topsoiling of the site, and all utilities, mechanical and electrical work both interior and exterior; the work also includes certain maintenance, management and site improvements.

Proposed forms of Contract Documents, including drawings and specifications are on file at the office of Cohoes Housing Authority, Cohoes, New York.

Copies of the Documents may be obtained from the Cohoes Housing Authorjty at any time during regular business hours prior to 4:00 P.M. by depositing $75.00 with it for each set of documents so obtained. The amount of the deposit will be refunded to Bidders only who return the Documents in good condition within ten (10) days after the opening of bids. Non-Bidders will not receive refunds. Sub-contractors and material suppliers will be considered non-bidders for refund purposes.

A certified check or bank draft payable to the Cohoes Housing Authority, U. S. Government Bonds or a satisfactory bid bond executed by the bidder and a surety company in the amount not less than five per cent (5%) of the bid shall be submitted with each bid.

The Cohoes Housing Authority reserves the right to reject any or all bids and to waive any informalities in bidding.

No bid shall be withdrawn for a period of thirty (30) days subsequent to the opening of bids without the consent of the Cohoes Housing Authority.

The successful bidder will be required to furnish and pay for a satisfactory performance and payment bond.

Attention is called to the fact that not less than the minimum salary and wages as set forth in the specifications must be paid on this project.

March 7, 1960

Cohoes Housing Authority
By John F. Kelly
Executive Director
83 Oneida Street
Cohoes, New York

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-5277) will be received at Denver, Colorado, until 2 p.m., Mountain Standard Time, May 24, 1960, for furnishing two (2) 93,500-horsepower, vertical shaft, Francis-type hydraulic turbines for Clear Creek Powerplant, Central Valley Project, California. Delivery is desired within 630 days. For particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

EMPLOYMENT OPPORTUNITIES

NATIONAL COVERAGE

DISPLAYED RATE:

The advertising rate is $39.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch in measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

APRIL 21ST
ISSUE
CLOSES
APRIL 11TH

UNDISPLAYED RATE:

$2.40 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Position Wanted ads take ½ of above rate.

Box numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

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ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36.

ADDRESS BOX NO. REPLIES TO: Box No.
Classified Adv. Div. of this publication.
Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 4: 68 Post St.

• POSITIONS VACANT

Equipment Superintendent: To organize and manage prevention, maintenance and repair of heavy construction equipment. Midwest location. P-4085, Engineering News-Record.

Wanted: Road Grader Operators. We are interested in securing two top road grader operators for work on state highway contracts in North Central Illinois. We will guarantee sufficient work for the entire 1960 season at union wages. Please contact P-4072, Engineering News-Record, as soon as possible.

Estimator—Expanding Philadelphia Contractractor has an opening for a man thoroughly experienced in competitive public bidding. Top pay and working conditions. Wingate Construction Company, 34 So. 17th Street, Phila., 3, Penna.

Assistant Town Engineer-Civil-Degree or some College preferred—age 20-30. Salary $4,900.00—$5,400.00. Small New England Town—population 9,000. Write, giving full resume and date available to P-4062, Engineering News-Record.

Chemical Plant Design Engineers Wanted. TVA has openings for engineers in the design of demonstration-scale plants and plant improvements for the production of phosphorus and phosphatic fertilizers and the production of ammonia, nitric acid, and nitrogen fertilizers. The annual entrance salary is $7150. The work location is Wilson Dam, Alabama, in the Tri-Cities area of Florence-Sheffield-Tuscumbia in northern Alabama. A bachelor of science degree or its equivalent in chemical, electrical, mechanical, or structural engineering with 3-5 years' experience in chemical plant design is required. All jobs carry automatic within-grade increases for satisfactory service, liberal vacation leave, sick leave, and retirement, hospitalization and insurance benefits. Write to: Tennessee Valley Authority, Employment Branch, Division of Personnel, Knoxville, Tennessee.

Prestressed Concrete Sales Engineer: To represent established expanding prestressed concrete plant in Denver, Colorado. Structural design background helpful. Desire top man as first assistant to managing director and capable of full charge. Salary open, profit sharing plan, vacation. Send complete resume. Strictly confidential. Craftsmen Construction Company, 1337 E. 18th Ave., Denver, Colorado.

Sales Engineer—Civil Preferred. Must have strong interest in sales, but experience not necessary. We are looking for several qualified men in 23-30 age group. Excellent opportunity for growth with large organization to work in construction specialty field. Salary plus liberal compensation. Automobile, expenses and many fringe benefits furnished. Send complete details. Strictly confidential. Write Johns-Manville Prod. Corp., Celite Division, 22 East 40th St., N. Y. 16, N. Y.

Concrete Paving Superintendent Opening for efficient operator, good organizer, knowledge of equipment and materials essential. Prefer middle age person. Salary commensurate with ability. Condon-Cunningham, Inc., 2324 Shore Crest Drive, Dallas 35, Ph FL 7-6537, Engineering News-Record.

POSITIONS VACANT

New Opportunity for Highway Engineer to travel and contact highway officers for 35-year-old national supply association. Desire go-getter with CE degree. Experience should include broad knowledge construction and specifications. Committee work with state and national associations of highway officers and ability in public speaking very useful. Chicago headquarters. Salary open. Send full resume. Strictly confidential. P-4164, Engineering News-Record.

Wanted—Sanitary engineer experienced in design of Sewage Treatment Plants. $8000. per year plus overtime and fringe benefits. Excellent opportunity for advancement. P-4188, Engineering News-Record.

Wanted: Engineer to teach in Mechanical Design program, Dutchess Community College, Poughkeepsie, New York. Qualifications: Masters Degree, will consider B.S. Degree with experience. Salary: commensurate with degree and experience. Contact Dean Brick, GRover 1-4500.

Construction Executive: With broad experience in commercial and public buildings to manage Central New York construction corporation crossing over $2,000,000 annually. Expanding domestically and to Foreign work. Must know all business phases and be accustomed to long hours, hard work and headaches. Please no specialists. Submit resume and salary to P-4166, Engineering News-Record.

• SELLING OPPORTUNITY AVAILABLE

Salesman construction equipment. Excellent opportunity with Minnesota distributor of broad line of heavy construction equipment. Attractive compensation & fringe benefits for executive type salesman. Send details of age, education & experience to: SW-4145, Engineering News-Record.

(Continued on opposite page)

"Put Yourself in the Other Fellow's Place"

TO EMPLOYERS

TO EMPLOYEES

Letters written offering Employment or applying for same are written with the hope of satisfying a current need. An answer, regardless of whether it is favorable or not, is usually expected.

MR. EMPLOYER, won't you remove the mystery about the status of an employee's application by acknowledging all applicants and not just the promising candidates.

MR. EMPLOYEE you, too, can help by acknowledging applications and job offers. This would encourage more companies to answer position wanted ads in this section.

We make this suggestion in a spirit of helpful cooperation between employers and employees.

This section will be the more useful to all as a result of this consideration.

Classified Advertising Division

McGRAW-HILL PUBLISHING CO., INC.
330 West 42nd St., New York 36, N. Y.

(Continued from opposite page)

• POSITIONS WANTED

Construction Superintendent. Experienced Hospitals, schools, banks, industrial, commercial buildings and high rise public housing. Quantity take-off, from bidding to final completion. PW-3868, Eng. News-Record.

Engineer (Geol.)—1½ yrs. in superv. of drilling and boring programs, exploration and prop. eval'n. One yr. in general eng. and blasting techs. Age 26 and avail. for travel. PW-4017, Engineering News-Record.

Executive (Female) Contract Manager, Attorney, Administrator, 15 yrs Legal-Construction Experience, Govt Contracts, Claims, Employed. PW-4033, Engineering News-Record.

Construction Supt. General Construction. PW-8896, Engineering News-Record.

Construction Mgr.—Gen. Supt. B.S.C.E. Age 43, 20 yrs extensive experience foreign & US all phases construction major Petrochemical, Refinery & Indus. plants. Management responsibility incl. estimating, budgeting, cost control, contract negotiations, labor relations, engineering & purchasing, customer relations & negotiations, financial, office & construction organization & administration. Will consider partnership or part interest. Available relocation immediately. PW-4097, Engineering News-Record.

Architectural Engineer, 38, German license, U. S. citizen, 8 years U. S. Experience in industrial and commercial planning and construction, seeks position overseas, Europe preferred. PW-4112, Eng. News-Record.

Estimator-Superintendent—15 years one Company. Thoroughly qualified to handle complete job bidding stage to completion. Sewage Disposal, Water Treatment, all types Heavy Construction. Will relocate to suit job. Best of references. PW-3913, Engineering News-Record.

Construction Engr.—College grad., married, age 37, 11 years exp. All phases industrial & commercial construction. Prefer Southeast. PW-4135, Engineering News-Record.

Project Management, contract administration, 22 yrs. exp. hvy. constr. major projects U. S. & O. S. PW-4119, Engineering News-Record.

Mgr. or Trouble-shooter, Cons't or allied fields. Headaches welcome. $13,000 min. Married, 35, P.E. New York. Syracuse-Ithaca area preferred. PW-4120, Eng. News-Record.

Construction Manager, Age 48, with 25 years experience, Desires connection with firm specializing in chemical and industrial type construction, Domestic or foreign. PW-4122, Engineering News-Record.

Available Hydraulic Dredge Civil Engineer. Many years experience in field investigation, estimates, consultant. Full time or Project Basis. PW-4024, Eng. News-Record.

Construction Administrator—25 yrs. one large N. Y. Contractor—Registered P.E.-Desire association established engineer consultant or contractor—Northern Jersey preferred but not mandatory—Will invest. PW-3974, Engineering News-Record.

Project Manager, B.S.C.E., 16 yrs. exp. hvy. const., hwys., flood control, earthwork, bldgs., Govt. contracts, field & office, employed. PW-3965, Engineering News-Record.

B.S.C.E. 30, Construction Superintendent desires management potential position with medium Western heavy and highway contractor. Minimum $12,000. PW-4084, Engineering News-Record.

Graduate Civil Engineer bored with his present sinecure desires a change to a working position. If its too rough for everyone else I'm your man. PW-4106, Eng. News-Record.

Excavating Supt. or General Supt. 15 year's Highway, Rock, Sanitary exp. Engineering background. Baltimore area. PW-4104, Engineering News-Record.

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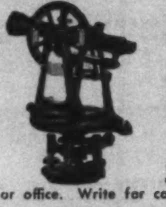

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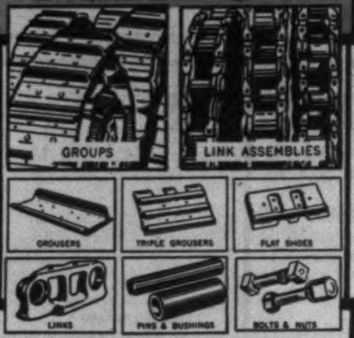

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Owner's Choice

THE PRICKLY PROBLEM of whether construction contracts for mechanical and electrical facilities should be sub or separate is currently being accorded one of its periodic airings. As in the past, partisanship is uncompromising—on the part of general contractors who favor subcontracting and by those mechanical specialty contractors who want to go their separate ways.

Latest developments are distribution by the National Association of Plumbing Contractors of a booklet titled "Efficiency and Economy with Separate Contracts, a Better Way to Build" and a new attempt by the Associated General Contractors to devise a plan for curbing bid shopping and bid peddling in order to improve their working relationship with the mechanical trades. The booklet's message implies that separate contracts are the only way to handle mechanical work. In the AGC discussion, universal use of the single contract system is tacitly assumed.

Neither of these viewpoints is realistic, nor even in the best public interest, since some jobs can be handled better by separate contracts, others by a single contract. In any event, the decision is the owner's, and he should not be denied a choice.

The purpose of the NAPC booklet, and an entirely legitimate one, is to influence owners, including architects and engineers, to make their choice in favor of using separate contracts for installation of such facilities as plumbing, heating, electrical work and air conditioning It claims that separate contracts will save money, and supports the claim by listing nine jobs on which bids were taken both ways. It claims that separate contracts permit the selection of the best qualified contractors and produce better service and more responsible work. And it argues that these advantages occur because there would be no bid shopping if separate contracts were used. The booklet also presents endorsements of the separate contract method by a number of government officials and executives of large industrial companies.

Here, at least, is one set of claims that an owner can consider in making his choice. But equally persuasive arguments favoring the single contract system are made by the general contractors. For one thing they can no doubt develop another list of jobs on which bids were higher with separate contracts than with a single contract. And they can press the claim that when jobs are under a single contract they can be scheduled, coordinated and managed better than when several contractors are working independently. They can point out that they can relieve the owner, or his architect or engineer, of this management responsibility.

General contractors can also argue that under the single contract system they have an equal and sometimes better chance than under separate contracts to select the best qualified mechanical contractors. Bid shopping by a few general contractors, they can point out, is matched by bid peddling by a few mechanical contractors, and both practices are on the wane, generally speaking. And they too can offer endorsements from satisfied users of their favored type of contract system.

The important thing is that, despite this welter of opposing claims, the owner still has the opportunity to choose whichever contract method best suits his job, or even just his fancy. He is going to exercise this choice, regardless, so it would seem to be the better part of wisdom for both the mechanicals and the generals in the contracting fraternity to adjust their differences and correct any abuses that work to the detriment of the owner. In the final analysis the owner's choice will favor the method that offers him the best service at the least cost.

What Price Loose Specs?

CERTAIN CLAUSES used all too frequently by specification writers tend to impair the quality of specifications. It would be instructive to know how much of a premium owners are paying for such loose writing.

Among the clauses known to lead to trouble are the notorious "or equal"; "as approved by the contracting officer"; and "as directed by the contracting officer." None of these is really necessary. An experienced specification writer should be able to attain the same objectives with more specific language.

For example, on work for private industry, naming of acceptable brands is always preferable to "or equal." On government work a result almost as good as giving brand names can be achieved by stating the performance standards that have to be met. Similarly, it is better to list the characteristics of an installation that will meet the approval of the contracting officer than to state vaguely that materials and equipment to be installed should be "as approved by the contracting officer." In addition, the need for approval often leads to construction delays and adds to costs.

In particular, the words "as directed by the contracting officer" should never be used. How is a contractor to know in advance what he is going to be asked to do and how can he estimate the cost of doing it? And how can he plan the work if he doesn't know how many times the contracting officer may change his mind during its execution.

Such clauses may sometimes achieve desired results, but they almost always make construction more costly than necessary. If they don't encourage contractors to insert a contingency fee in their bids, they can be a basis for extras or lawsuits. They can also provide a loophole that permits a contractor to substitute materials or equipment inferior to those desired by the designers.

Perhaps if a price could be put on loose specifications, the bad writing practices would stop.

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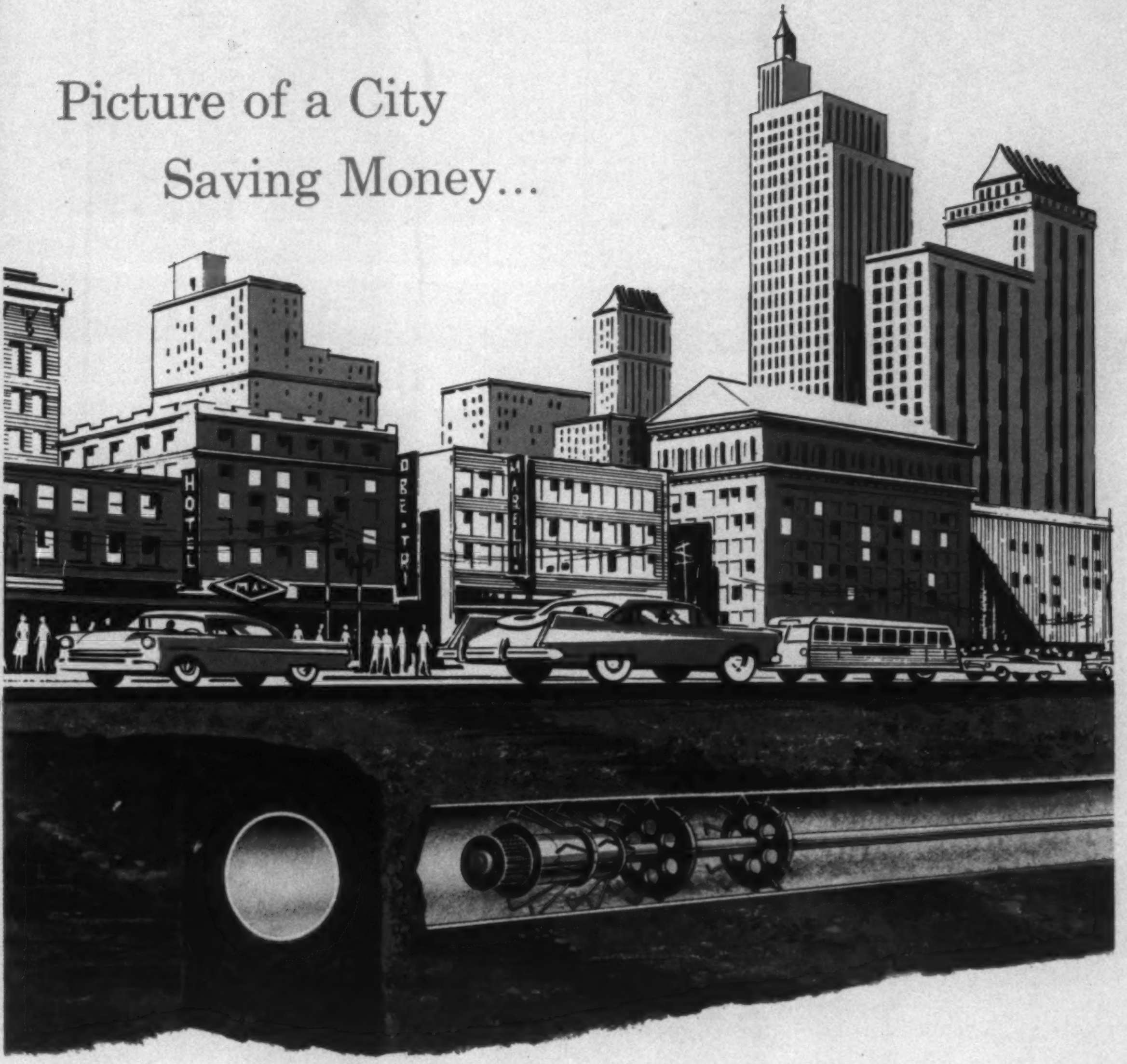

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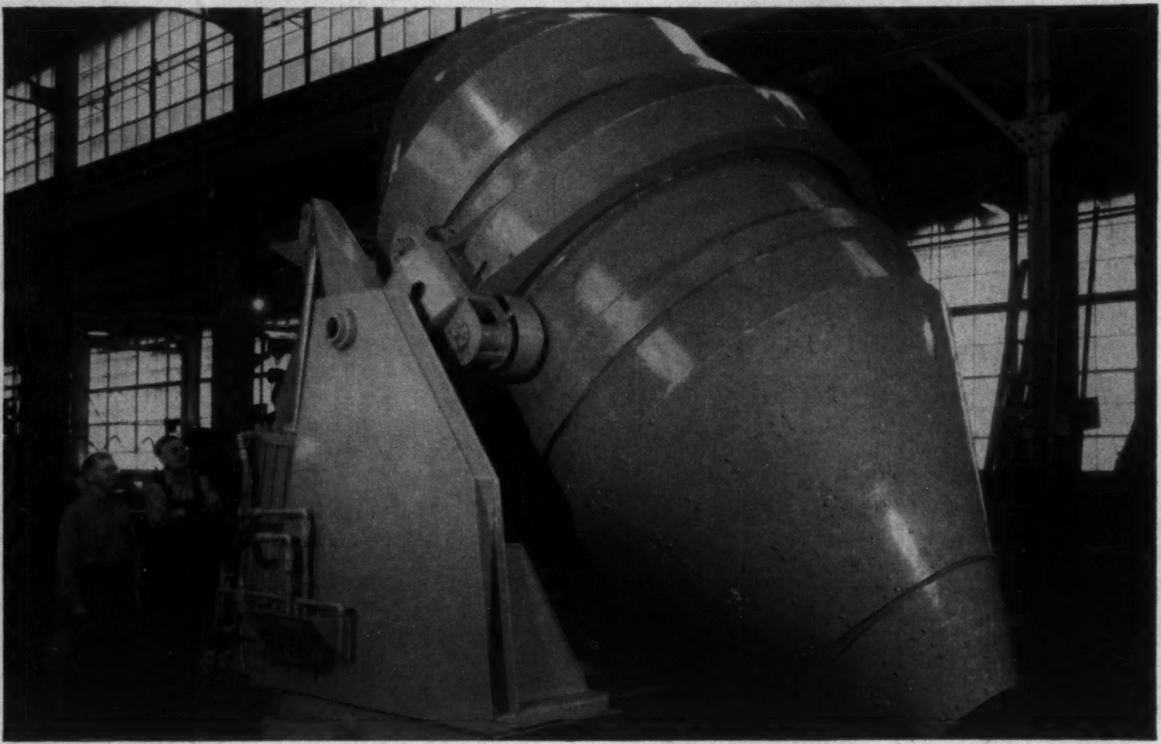

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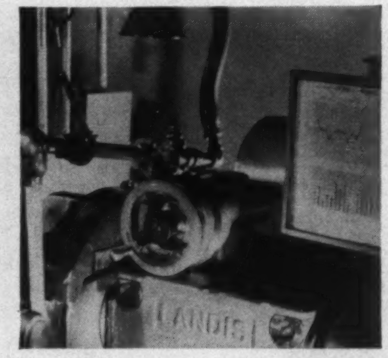

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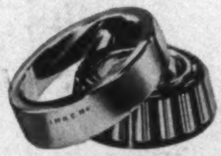

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